AD-A126 609 COMPOSITE ENVIRONMENTAL STATEMENT FOR OPERATIONS AND MAINTENANCE OF FOUR PROJECTS IN THE MERMENTAU BASIN LOUISIANA(U) ARMY ENGINEER DISTRICT NEW ORLEANS LA 1/3

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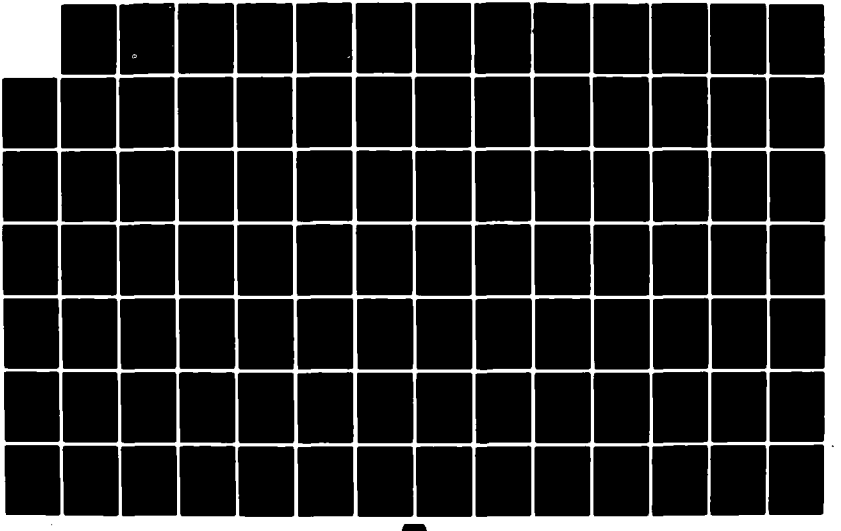

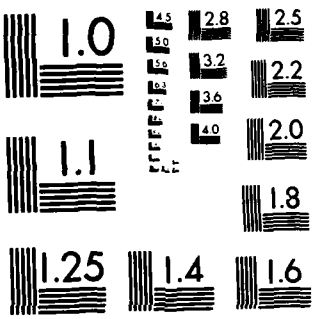

FINAL

Composite Environmental Statement For Operations And Maintenance Of Four Projects In The Mermentau Basin, Louisiana

- MERMENTAU RIVER - GULF OF MEXICO NAVIGATION CHANNEL, LOUISIANA
- MERMENTAU RIVER, LOUISIANA
- BAYOU PLAQUEMINE BRULE', LOUISIANA
- BAYOU QUEUE DE TORTUE, LOUISIANA

OCTOBER 1981

US Army Corps of Engineers
New Orleans District

S U M M A R Y

COMPOSITE ENVIRONMENTAL STATEMENT FOR OPERATIONS AND MAINTENANCE OF FOUR PROJECTS IN THE MERMENTAU BASIN, LOUISIANA

( ) Draft (X) Final Environmental Statement

Responsible Office: US Army Engineer District, New Orleans
Corps of Engineers
P.O. Box 60267
New Orleans, Louisiana 70160
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1. Name of Action: (X) Administrative ( ) Legislative

2. Description of Actions: The actions consist of maintenance dredging, flood control, operation of water control structures, and clearing and snagging in four existing projects. The projects: (1) Mermentau River - Gulf of Mexico Navigation Channel, Louisiana, bar channel; (2) Mermentau River, Louisiana; (3) Bayou Plaquemine Brule', Louisiana, and; (4) Bayou Queue de Tortue, Louisiana, are located in the Mermentau River Basin, southwestern Louisiana.

a. Mermentau River - Gulf of Mexico Navigation Channel, Louisiana (bar channel): This project provides for maintenance dredging of a 15- by 200-foot channel within the jetties extending through the bar at the river's mouth and offshore to the 15-foot contour. Assumption of maintenance of the project was authorized in 1976.

b. Mermentau River, Louisiana: This project provides for maintenance dredging of a 3,000-square foot flood control channel in the Mermentau River from Grand Lake to the northern end of Lower Mud Lake, a distance of 18 miles; maintenance dredging of a 3,000-square foot flood control channel in the Inland Waterway between Grand Lake and White Lake, a distance of 6.5 miles; maintenance dredging of a 3,000-square foot flood control channel in the Inland Waterway between White Lake and Vermilion Bay, a distance of 12 miles; maintenance dredging of a 6- by 60-foot navigation channel in the North Prong of Schooner Bayou, a total distance of 5 miles; maintenance dredging of a 5- by 40-foot navigation channel from White Lake to Pecan Island, a distance of 2 miles; and operation and maintenance of two water control structures at Catfish Point and Schooner Bayou. Construction of the project was completed in 1952.

c. Bayou Plaquemine Brule', Louisiana: This project provides for maintenance of a 6- by 60-foot channel, through cutoffs, from the mouth of Bayou Plaquemine Brule' to a point near Crowley, Louisiana, a distance of 19 miles. Construction of the project was completed in 1915.

d. Bayou Queue de Tortue, Louisiana: This project provides for maintenance of a channel of unspecified dimensions, through cutoffs, from the mouth of Bayou Queue de Tortue to the Southern Pacific Railroad Bridge at Riceville, Louisiana, a distance of 14 miles. Construction of the project was completed in 1923.

3. a. Environmental Impacts: Environmental impacts result from (a) disposal of dredged materials, and (b) operation and maintenance of the barrier structures during rice irrigation season to prevent saltwater intrusion into the upper river and Grand and White Lakes. Maintenance of the waterways will provide continued navigation benefits for transport of petroleum, marine shells, supply boats for these industries, and commercial fishing boats. Flood control protection will continue to be provided to adjacent property owners. Clearing and snagging operations will keep the waterways open for recreational boating, permitting continued hunting and fishing opportunities which are major recreational pursuits in the project area. Project control structures serve to maintain fresh water levels in Grand and White Lakes for use in rice cultivation. Additionally, the structures prevent saltwater intrusion which might arise from tidal action, or hurricanes.

b. Adverse Environmental Effects: Approximately 3,460 acres of marsh will be utilized for maintenance dredging disposal sites. As dredged material is placed on this marsh, the vegetation will be destroyed. The area should revegetate with herbs, shrubs, and then trees; complete coverage will take 2-5 years. The fish and wildlife value of this elevated ground will be much less than marsh. As subsidence occurs, marsh vegetation should invade and eventually the area should return to its former productivity. Maintenance dredging will temporarily increase water turbidity, decreasing light penetration necessary for photosynthesis. Impacts caused by the presence of mercury in the sediments are difficult to assess. In terms of this project, with background mercury levels slightly exceeding EPA criteria, maintenance dredging will not cause a significant impact on the aquatic ecosystem. Snagging and clearing will interfere with wildlife resources on a minor scale, but may increase turbidity levels temporarily. Operation of the two water control structures has resulted in reduced habitat for shrimp, crabs, and other marine organisms, resulting in adverse impacts to fishery resources.

4. Alternatives:

a. Alternative Methods of Disposal.

(1) Dredge hydraulically onto adjacent areas.
(2) Dredge hydraulically onto adjacent water bottoms.
(3) Dredge hydraulically onto diked areas.
(4) Dredge by casting and stacking.
(5) Complete removal of dredged material.

b. No Action.

5. Comments:

a. Comments on the draft EIS were received from the following agencies:

US Department of the Interior, Assistant Secretary for Program Development and Budget, Office of Environmental Project Review

Environmental Protection Agency, Regional Administrator, Region VI

US Department of Commerce, Regional Director, National Marine Fisheries Service

US Department of Agriculture, State Conservationist, Soil Conservation Service

Federal Energy Regulatory Commission, Advisor on Environmental Quality

Department of Housing and Urban Development, Environmental Clearance Officer

Department of Transportation and Development, Office of Public Works

Louisiana Department of Wildlife and Fisheries

Department of Culture, Recreation and Tourism, Office of Program Development

State of Louisiana, Department of Natural Resources, Office of Forestry

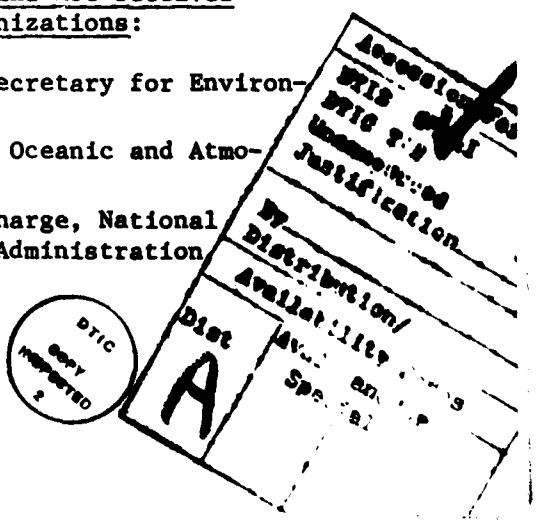
Environmental Defense Fund

b. Comments on the draft EIS were requested and not received from the following agencies and environmental organizations:

US Department of Commerce, Deputy Assistant Secretary for Environmental Affairs

US Department of Commerce, Director, National Oceanic and Atmospheric Administration, National Ocean Survey

US Department of Commerce, Meteorologist in Charge, National Weather Service, National Oceanic and Atmospheric Administration



US Department of Agriculture, Regional Forester, Forest Service

US Department of Transportation, Division Engineer, Federal Highway Administration

US Department of Transportation, Commander, Eighth Coast Guard District

US Department of Health, Education, and Welfare, Regional Director, Public Health Service, Region VI

US Department of Health, Education, and Welfare, Water Resources

Louisiana State University, Associate Director, Sea Grant Program, Center for Wetland Resources

Louisiana State University, Coastal Studies Institute

Louisiana State University, Curator of Anthropology, Department of Geography and Anthropology

University of New Orleans, Coordinator, Environmental Impact Section, Department of Environmental Affairs

University of New Orleans, Department of Anthropology and Geography

Ecology Center of Louisiana, Inc.

Orleans Audubon Society, c/o Mr. Clifford Danby

Orleans Audubon Society, c/o Mr. Barry Kohl

National Audubon Society, Library

National Audubon Society, Southwestern Regional Office, Regional Representative

Delta Chapter, Sierra Club, New Orleans

National Wildlife Federation, Washington, DC

Louisiana Wildlife Federation, Baton Rouge

Wildlife Management Institute, Washington, DC

Wildlife Management Institute, South-Central Field Representative

The Conservation Foundation

Natural Resources Defense Council

Environmental Information Center, Inc.

League of Women Voters of US

Bass Anglers Sportsman Society of America

Slidell Sportsmen's League

Louisiana Environmental Professionals Association

South Louisiana Environmental Council, Houma

The Fund for Animals, Inc., Field Agent

Gulf States Marine Fisheries Commission

South Central Planning Development Commission

6. Draft statement to EPA 3 August 1979

Final statement to EPA _____

DELETIONS AND ADDITION OF PROJECTS FROM DRAFT EIS

The Draft Environmental Impact Statement (DEIS) published in June 1979 included a discussion of the impacts of operation and maintenance of the Mermentau River, Bayous Nezpique and Des Cannes, Louisiana. Construction impacts of this project were discussed in an August 1971 Final EIS. However, the project is only partially complete and construction has been delayed pending economic reanalysis. Since completion of the project is uncertain, and plans will need to be reformulated to comply with environmental criteria, an EIS will not be prepared at this time. Accordingly, the project has been deleted from the FEIS and a new DEIS will be prepared on operation and maintenance aspects if the project is ever completed.

On the other hand, the March 1977 FEIS for the Mermentau River - Gulf of Mexico Navigation Channel does not contain sufficient information to satisfy Section 103 of the Marine Protection Research and Sanctuaries Act. Some of the impacts of dredging the bar channel were discussed in the June 1979 Draft Composite EIS on the Mermentau Basin projects, but no project description was presented. Therefore, this FEIS includes a description of work to be done in the bar channel of the Mermentau River - Gulf of Mexico Navigation Channel and a discussion of its impacts. An Ocean Dumping Assessment is included as Appendix F.

The June 1979 Draft Composite EIS included maintenance of the Mermentau River from Catfish Point to the Gulf. However, it has been decided that maintenance of the natural Mermentau River through Mud Lake to the Gulf is not necessary since the Mermentau River - Gulf of Mexico Navigation Channel provides adequate flood flows. Accordingly, the portion of the natural Mermentau River project through Mud Lake to the Gulf has been deleted from this FEIS.

The 1979 DEIS did not include the Section 404(b)(1) Evaluation necessary to comply with the Federal Water Pollution Control Act as amended by the Clean Water Act. Bayou Plaquemine Brule, Louisiana, and Bayou Queue de Tortue, Louisiana, projects provide for maintenance by clearing and snagging only; thus, a 404(b)(1) Evaluation is not necessary for those projects. Since no prior 404(b)(1) Evaluation was prepared for the Mermentau River - Gulf of Mexico Navigation Channel, Appendix D includes a 404(b)(1) Evaluation for the entire project except the bar channel. A 404(b)(1) Evaluation has also been prepared for the Mermentau River, Louisiana, project.

OPERATIONS AND MAINTENANCE OF FOUR PROJECTS IN THE MERMENTAU BASIN, LOUISIANA

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MERMENTAU RIVER - GULF OF MEXICO NAVIGATION CHANNEL, LOUISIANA
(Bar Channel Only)
MERMENTAU RIVER, LOUISIANA
BAYOU PLAQUEMINE BRULE', LOUISIANA
BAYOU QUEUE de TORTUE, LOUISIANA

FINAL ENVIRONMENTAL STATEMENT

SECTION 1 - PROJECT DESCRIPTIONS

1.01 NAME AND LOCATION

Four existing projects are described in this statement. The projects: (1) Mermentau River - Gulf of Mexico Navigation Channel, Louisiana (bar channel only); (2) Mermentau River, Louisiana; (3) Bayou Plaquemine Brule', Louisiana, and; (4) Bayou Queue de Tortue, Louisiana, are located in the Mermentau River Basin, southwestern Louisiana (see Plate 1). The northern limits of the basin are roughly the northern boundaries of Allen and Evangeline Parishes. On the east, the boundaries reach to near dredged material disposal areas on the west bank of Freshwater Bayou Canal and on the west to near Louisiana Highway 27. The southern boundary is the Gulf of Mexico. The basin includes all of Acadia Parish; substantial areas of Cameron, Evangeline, Jefferson Davis, and Vermilion Parishes; and small areas of Allen, Calcasieu, Lafayette, and St. Landry Parishes. Although each project involves different environmental impacts, they are interrelated and are, therefore, treated as a unit.

1.02 PURPOSE, STATUS AND PLAN

a. General. The projects will continue to serve the multiple purposes of flood control, navigation, prevention of saltwater intrusion, and retention of fresh water for agricultural purposes. Continued use of the flood control and navigation channel features of the projects requires that suitable channel dimensions be maintained. Frequency and location of dredging is related to the location and rate at which sediment accumulation occurs. Detailed information concerning frequency, location, and volume of dredged material to be removed is contained in the Section 404 Evaluation appended to this EIS. In the past, certain areas have been dredged with sufficient frequency to allow partial determination of maintenance dredging locations and frequency. Proper functioning of locks and control structures requires operation and structural maintenance and annual removal of sediment and accumulated debris; junctions of major waterways can accumulate several hundred thousand yards of material which may require removal at 7- to 10-year intervals. Other sections of the projects, due either to channel depth or a lack of a significant sediment load, have not accumulated sufficient material to require dredging. Present maintenance dredging status may be summarized as ongoing

with determination of locations to be dredged based on reports of accumulations of materials which interfere with waterborne commerce and other waterway uses. Dredging along all segments of these waterways will be done with a bucket dredge using the cast and stack method of disposal, or with a cutterhead pipeline dredge utilizing combinations of floating and shore pipeline to transport dredged material to disposal sites. At present, it is planned that all dredged material will be placed in diked disposal areas, with the exception of Lower Mud Lake. When diked disposal areas are used, dredged effluent will be allowed to return to the waterway through control spillgates. For undiked disposal, effluent is allowed to run freely and return to the waterway by way of natural drainage patterns in the disposal area. In either case, lateral streams, canals, sloughs, and bayous are protected with diking or by careful placement of the discharge pipe to prevent silt from blocking or interrupting water flow in them. Existing disposal areas will be used for dredged material disposal to the fullest extent possible. Disposal areas for each project are discussed in this section under maintenance of the projects in paragraphs b(2) and c(2). Dredged material will be deposited in areas along both sides of these waterways as depicted in the accompanying plates; however, specific locations and disposal methods will be determined as maintenance dredging is required. Interagency inspections of the proposed disposal sites will be made before dredging plans and specifications are finalized. Easement limits for dredged material disposal areas delineated in this environmental statement were current at the time of publication. Exact limits at any time thereafter may vary to accommodate expirations and accessions of easement rights, based on need and other qualifying factors.

b. Mermentau River - Gulf of Mexico Navigation Channel, Louisiana (bar channel).

(1) Project features. This navigation channel was built in 1971 by the East Cameron Port Harbor and Terminal District, and consists of a 15- by 100-foot channel from Grand Cheniere to the gulf and a 15- by 200-foot jettied channel extending 1.6 miles into the gulf. The entire project was described in a March 1977 Final EIS. The present EIS only considers impacts of maintenance of the bar channel (Plate 2). The land cut is dredged up to 18-feet deep to provide advance maintenance and allowable overdepth. The bar channel is initially dredged up to 19-feet deep for the same reason.

(2) Maintenance. The majority of flows of the Mermentau River pass to the gulf through the navigation channel. With an average annual flow of 3,000 cubic feet per second, approximately 240,000 cubic yards of sediment traverse the channel annually. At the current rate of deposition, approximately 80,000 cubic yards of sediment would be deposited into the offshore portion channel annually. The remainder of the sediment passes beyond the limits of the channel's construction. Maintenance dredging of the bar channel is required approximately every 2 years.

c. Mermentau River, Louisiana.

(1) Project features. This project provides for maintenance dredging of a 3,000-square foot flood control channel in the Mermentau River from Grand Lake to the northern end of Lower Mud Lake, a distance of 18 miles; maintenance dredging of a 3,000-square foot flood control channel in the Inland Waterway between Grand Lake and White Lake, a distance of 6.5 miles; maintenance dredging of a 3,000-square foot flood control channel in the Inland Waterway between White Lake and Vermilion Bay, a distance of 12 miles; maintenance dredging of a 6- by 60-foot navigation channel in the North Prong of Schooner Bayou, a total distance of 5 miles; maintenance dredging of a 5- by 40-foot navigation channel from White Lake to Pecan Island, a distance of 2 miles; and operation and maintenance of two water control structures at Catfish Point and Schooner Bayou (see Plate 3). Construction of the project was completed in 1952. Two feet of combined advance maintenance and allowable overdepth will be included each time the North Prong or White Lake to Pecan Island sections are dredged.

(2) Maintenance

(a) Mermentau River segment. Existing disposal easements, previously used disposal areas, and unused disposal areas for this segment are depicted on Plates 4 through 8. Table 1 shows acres of disposal area, marsh type affected, and possible water quality problems for all segments of this project. Maintenance dredging for this segment is required every 7 years. Dredging will be performed by hydraulic pipeline dredge, with dredged material confined by retention dikes. Dredged material shall be placed within designated disposal areas which generally consist of small retaining dikes 4 to 5 feet high and a controllable weir whereby desired retention time can be achieved and waters from the disposal areas returned to the channel being dredged. Over the next 50 years, approximately 17,500,000 cubic yards of dredged material will be removed from the authorized channel. Of the 2,453 acres of disposal easements available, approximately 937 acres have been used thus far. Approximately 1,000 acres of easements will be required for the 50-year project life. Table 1 indicates project segment, approximate area of disposal required for the 50-year project life, approximate volume of dredged material, marsh type, and heavy metal occurrence.

(b) Grand Lake to Vermilion Bay segment. (Includes North Prong of Schooner Bayou and Schooner Bayou Cutoff). Existing disposal easements, previously used disposal areas, and unused disposal areas for this segment are depicted on Plates 9 through 14. With the exception of Schooner Bayou Cutoff, no maintenance dredging of this segment has been performed since it was constructed in 1951. Schooner Bayou Cutoff is being maintained at larger dimensions under the authorized "Freshwater Bayou, Louisiana," project. For the remainder of the Grand Lake to Vermilion Bay segment, it is estimated that maintenance dredging may be required twice over the next 50 years. No dredging is scheduled at the present time. Dredging will be performed by hydraulic pipeline dredge, with dredged material confined by retention dikes.

Table 1. Project Segments, Approximate Acreage of Disposal, Approximate Dredge Material Volume, Marsh Type, and Heavy Metal Occurrences, Mermentau River, LA, Project.

Project Segment	Plate Number	Disposal Area	Appx. Acres	Marsh Type	Estimated Volume Per Dredging	Heavy Metal Problem	Frequency of Maintenance
Mermentau River - Gulf of Mexico Navigation Channel (Bar channel)	2	In gulf	123	N/A	226,000		2 years
Mermentau River - Catfish Point to Gulf of Mexico	4		20	B	2,500,000		7 years
			28				
		A	32				
		B	20				
		C	28				
	4-5	D	29				
	5	E	8				
		F	12				
		G	17				
		H	22				
		I	19				
		J	14				
		K	13				
		L	31				
		M	9				
		N	14				
		O	50				
	6	P	52				
		Q	63			Ni, Hg	
		R	14			Ni, Hg	
		S	24			Ni, Hg	
		T	22			Ni, Hg	
	7	U	120			Ni, Hg	
	7-8	V	197	I			
	8	W	120				
Grand Lake to White Lake	9	A	69	F	6,700,000*		25 years
		B	59**			Cd, Cu	
		C	11			Cd, Cu	
	10	D	134			Cd	
		E	150**			Cd	

Project Segment	Plate Number	Disposal Area	Appx. Acres	Marsh Type	Estimated Volume Per Dredging	Heavy Metal Problem	Frequency of Maintenance
White Lake to Vermilion Bay Waterway	11	--	666	F			25 years
	12	--	645	F			
	13	--	404	F-I		Cu	
Schooner Bayou, North Prong	14	--	260	F-I	Unknown	Cu	25 years
White Lake to Pecan Island Channel	15	--	75	F	Unknown	Cd	25 years
TOTAL MARSH			3,461				

Legend:

Marsh Types: B = Brackish
I = Intermediate
F = Fresh

* This total amount of material will be removed from two segments of the Waterway: Grand Lake to White Lake, White Lake to Vermilion Bay. The amount to be removed from White Lake to Pecan Island and the North Prong of Schooner Bayou is unknown.

**Plates 9 and 10 indicate 290 and 150 acres of disposal, respectively, in lakes. These areas would not be utilized.

Over the next 50 years, it is estimated that 13,400,000 cubic yards may be removed from the authorized channel. Of the nearly 2,900 acres of disposal easements available, approximately 2,840 acres, including 440 acres of lake bottom, have been used thus far. The same disposal areas will be reused for any future maintenance dredging; however, no lake bottoms will be used; thus, only 2,400 acres are available in this segment.

(c) White Lake to Pecan Island segment. Existing disposal easements for this segment are depicted on Plate 15. The extent and location of past dredged material disposal is not known; however, it is assumed that the material was placed on both banks of the Pecan Island channel. The channel was last dredged in 1939. No estimate has been made of when maintenance dredging will be required or the amount of material that will be removed over the next 50 years. Of the 331 acres of disposal easements available, approximately 75 acres should be sufficient for any future maintenance dredging.

(3) Operation of water control structures. The regulation of the freshwater reservoir of the lower Mermentau River Basin presents a complex problem of water management. Requirements for rice irrigation, flood control, navigation, fish and wildlife, and drainage are quite divergent and vary with the seasons and with hydrologic and meteorologic events. One or more interests could be adversely affected with varying degrees of severity, unless the needs of all were considered. Consequently, a flexible plan of regulation, based on current data and conditions, is essential to obtain the maximum benefits to the project and to minimize and distribute losses equitably to interests concerned. The following general plan of operation, in use since 1962 and amended in 1979, will continue to be used until experience indicates need for further modification: (Stages are in feet above mean low gulf and are the general average stage of the lakes and Intracoastal Waterway, determined by evaluation of the several gage readings, and wind and other influences affecting water levels).

(a) Flood control. For flood control purposes, gates will be open to permit escape of floodflows when stages are above 2.0 feet and no modifying conditions, as discussed below, prevail.

(b) Flood control and rice irrigation. During the period 1 December to 30 August, except as required for flood control, gates will be operated to conserve fresh water and exclude salt water, except that during the rice irrigation season (April through August) when heavy withdrawals for irrigation exceed runoff and lake storage is being drawn upon, Schooner Bayou Control Structure will be operated in accordance with those forecast conditions to draw water from Vermilion Bay to keep waterway and lake levels from falling below zero stage (for the benefit of navigation) and to assist in making the maximum amount of fresh water available for irrigation.

(c) Overall results. When rules (a) and (b) above are in partial conflict, as they will be when stages are above 2.0 feet during certain periods of the year, all pertinent conditions, including antecedent and forecast meteorologic conditions, will be considered and the gates will be operated to obtain maximum benefits to the project.

(d) Stage conditions. During the period 1 September to 30 November, gates will be operated as stage conditions require for the overall optimum benefit of flood control [(a) above], navigation, evaluation of intruded salt water, and fish and wildlife production. Operation of Calcasieu Lock and Vermilion Lock on the Gulf Intracoastal Waterway (GIWW) and Freshwater Bayou Lock on Freshwater Bayou are synchronized with the operation of the Catfish Point and Schooner Bayou Control Structures.

(e) Catfish Point Control Structure has been operated since 1976 to permit ingress of juvenile shrimp and crabs when it was determined by the New Orleans District Office, Operations Division, that such action would not have serious adverse effects on the salinity of inside waters. This change in operation was due to a request by the US Fish and Wildlife Service, National Marine Fisheries Service, and the Louisiana Department of Wildlife and Fisheries. In 1979, the Operation and Maintenance Manual for Schooner Bayou was changed to direct a similar opening to allow ingress of marine organisms. Such operations were and continue to be coordinated with the Louisiana Department of Wildlife and Fisheries, who notify the lock operator when juvenile shrimp are in the vicinity.

d. Bayou Plaquemine Brule', Louisiana

(1) Project features. This project provides for maintenance of a 6- by 60-foot channel, through cutoffs, from the mouth of Bayou Plaquemine Brule' to a point near Crowley, Louisiana, a distance of 19 miles (see Plates 16 and 17). Construction of the project was completed in 1915.

(2) Maintenance. Maintenance of this project consists of removal of obstructions by clearing and snagging only; no dredging is involved. Clearing consists of removal of overhanging branches and trees which are leaning into the channel. No bank clearing is performed. Snagging consists of removal of brush, fallen trees or other floating or sunken debris which block the channel. Maintenance was last performed on Bayou Plaquemine Brule' in 1946. No maintenance is planned for the near future.

e. Bayou Queue de Tortue, Louisiana

(1) Project features. This project provides for maintenance of a channel of unspecified dimension, through cutoffs, from the mouth of Bayou Queue de Tortue to the Southern Pacific Railroad Bridge at Riceville, Louisiana, a distance of 14 miles (see Plates 18 and 19). Construction of the project was completed in 1923.

(2) Maintenance. Maintenance of this project consists of removal of obstructions by clearing and snagging only; no dredging or bank clearing is involved. Maintenance was last performed on Bayou Queue de Tortue in 1969. The existing channel flow is sufficient to carry the increased flow resulting from upstream channel improvements by the State of Louisiana. No maintenance is planned for the near future.

1.03 AUTHORIZATION

a. Mermentau River - Gulf of Mexico Navigation Channel, Louisiana. The House Committee on Public Works adopted a set of resolutions which authorized the survey "Mermentau, Vermilion, and Calcasieu Rivers and Bayou Teche, Louisiana." Under that authorization, the Office, Chief of Engineers, directed that a study be undertaken and report prepared on the Federal assumption of maintenance of the Mermentau River-Gulf of Mexico Navigation Channel. The project was authorized by Congress on 22 October 1976, under the Water Resources Development Act of 1976 (Public Law 94-587).

b. Mermentau River, Louisiana. This project was authorized by the Flood Control Act of 18 August 1941, as modified by the River and Harbor Act of 24 July 1946. The project was reclassified as an "Operation and Maintenance, General" project under the category, "Navigation (locks, dams, reservoirs and canals)" by authority of the Office, Chief of Engineers, in 1st Indorsement, 23 April 1956, on letter of the Division Engineer, US Army Engineer Division, Lower Mississippi Valley, 6 March 1956, subject, "Classification of the Mermentau River and Bayou Teche and Vermilion River, Operation and Maintenance, General Projects."

c. Bayou Plaquemine Brule', Louisiana. This project was adopted by the River and Harbor Act of 25 June 1910.

d. Bayou Queue de Tortue, Louisiana. This project was adopted by the River and Harbor Act of 25 July 1912.

1.04 INTERRELATIONSHIP AND COMPATIBILITY OF PROJECTS WITH EXISTING CORPS OF ENGINEERS OR OTHER AGENCY PROJECTS

a. Corps of Engineers

(1) Gulf Intracoastal Waterway between Apalachee Bay, Florida, and the Mexican border. Present channel dimensions are 12- by 125 feet from the Mississippi River to the Sabine River. This waterway bisects the Mermentau Basin. Two features of the project, Vermilion Lock and Calcasieu Lock, serve the purposes of navigation, prevention of saltwater intrusion, and conservation of fresh water.

(2) Grand and White Lakes Water Management Study. As an interim feature under the "Mermentau, Vermilion and Calcasieu Rivers and Bayou Teche, Louisiana Study," an investigation of the Grand and White Lakes area will be conducted. This interim study will include flood control and irrigation, fish and wildlife purposes, and navigation as related to the Grand and White Lakes area. The study will not be constrained to the operation of the existing system, with the prime purpose being an adequate supply of navigation water, but will investigate all purposes stated above on an equal basis.

b. US Department of Agriculture (USDA). The Soil Conservation Service of the USDA has planned or completed the following drainage projects in the Upper Mermentau Basin: Duralde-Des Cannes Watershed, Upper Bayou Nezpique Watershed, West Fork of Bayou Laccassine Watershed, Bayou Plaquemine Brule' Watershed, Seventh Ward Canal Watershed, and Bayou Blue Watershed. Bayou Mallet and Bell City Watersheds are in the active planning phase. The Cameron Creole Watershed project adjoins the western boundary of the Mermentau Basin. Plans call for diversion of fresh water from the Mermentau Basin into the East Cove Marsh area just east of Calcasieu Lake to reduce saltwater intrusion and increase wetland productivity.

c. State of Louisiana. The State of Louisiana has completed drainage improvements in Bayou Queue de Tortue from its headwaters to a point 5 miles upstream from Riceville, Louisiana. Channelization of the bayou from that point to a point 2 miles upstream from Riceville is planned for the near future.

d. Interrelationship and compatibility of projects. The Grand and White Lakes Water Management Study could alleviate some of the environmental problems caused by the subject projects. Navigation channel features of the Mermentau River-Gulf of Mexico Navigation Channel, Louisiana, project and the Mermentau River, Louisiana, project serve as feeder waterways for commerce entering or leaving the Gulf Intracoastal Waterway. Proper maintenance of these interconnecting projects is essential to the continued functioning of the system. The Calcasieu

Lock, Catfish Point Control Structure, Schooner Bayou Control Structure, and Vermilion Lock serve to prevent saltwater intrusion and, functioning as a unit, enable the Lower Mermentau Basin to be used to store fresh water for agricultural purposes. Improved agricultural drainage resulting from proposed and completed Soil Conservation Service and State of Louisiana projects will have the net cumulative effect of increasing water flows into the Lower Mermentau Basin and, at certain times of the year, increasing water levels in some areas. These drainage projects also increase siltation in navigation projects which causes increased dredging efforts.

SECTION 2--ENVIRONMENTAL SETTING WITHOUT THE PROJECT

2.01 GENERAL DESCRIPTION

The Mermentau River Basin comprises an area of about 3,700 square miles of coastal marsh, prairies, and uplands in southwestern Louisiana. The northern limit of the study area (see Plate 1) approximates the northern boundaries of Evangeline and Allen Parishes, and the southern limit is the Gulf of Mexico. To the west, the boundaries approximate the alinement of Louisiana Highway 27; and to the east, they reach to near disposal areas on the west bank of Freshwater Bayou Canal. This study area includes that portion of the Gulf Intracoastal Waterway between Vermilion Lock and Calcasieu Lock.

2.02 GEOLOGICAL ELEMENTS

a. Introduction. Regionally, the study area is situated within the north central Gulf Coastal Plain in southwestern Louisiana. The southern portion of the Coastal Plain consists of a series of wide, seaward tilted, coastwise terraces and a belt of near sea level coastal marshes, and east-west trending stranded beach ridges (cheniers). To the east of the study area is an extensive system of river belt meander deposits associated with the ancient Mississippi River, and to the west is found the entrenched alluvial valley of the Calcasieu River.

b. Physiography and geomorphology. The western portion of the Teche Deltaic Plain was formed more than 4,000 years ago during the Bayou Cypremort phase of the history of the Teche Delta complex. Subsequently, the coastal plain south and west of the study area was deposited by longshore coastwise currents that swept sediments westward from the fronts of the various deltas. These were formed during successive stages of the history of the alluvial plain of the Mississippi River. The seaward portion of this coastal plain has been modified into the present Chenier Plain by alternating advance and retreat of the shoreline, resulting in formation of stranded beaches within the marsh. During Pleistocene time, elevated coastwise terraces were formed by the action of streams rejuvenated by changes in sea level due to glacial activity. Relief is generally slight throughout the area.

Elevations range from 0 to 10 feet mean sea level (msl) in the marshes where cheniers exist, to nearly 170 feet msl on the dissected Montgomery Terrace of eastern Allen Parish.

c. Geologic formations. Surface deposits in the region are quite varied and typical of the Gulf Coast plain. Delta and terrace sedimentation ranges from indurated sands and gravels to thick sequences of poorly consolidated peats and clays. These deposits, except for a few small areas overlying emergent salt domes, are entirely Quaternary (Pleistocene and Holocene) in age.

d. Economic geology. Sand and petroleum are the principal products within the study area.

(1) Gravel and sand production. The majority of pits or localities mined for gravel or sand in Louisiana are sporadically operated and rarely worked actively for more than a few years. No gravel pits are known to be active at present within the study area.

(2) Petroleum. Commercial accumulations of petroleum, natural gas, sulphur, and salt are associated primarily with salt intrusion in the central gulf coast area. Thus, exploration for and exploitation of such resources is necessarily linked with the origin, distribution, and dynamics of salt domes and associated features. The Louisiana Department of Conservation in its Annual Oil and Gas Report for 1974 estimated crude petroleum and condensate production in the basin area at 43 million barrels or 10 percent of the state total. The production of casinghead and natural gas was estimated at 1,244,063,192 MCF or 27 percent of the state total. These figures, however, do not include production in the more remote offshore fields. Most of the value of mineral production in the economic area is from petroleum and natural gas production.

(3) Rock salt and brine production. Rock salt has been mined in Louisiana since 1862 when John Marsh Avery opened the mine at Petite Anse, now known as Avery Island. In 1975, Louisiana ranked first nationwide in the production of salt with approximately 12,166,000 short tons valued at $77,116,000. Fourteen companies mined salt at 18 localities in 10 parishes, none of which are in the study area. Two companies operate brine wells near the study area: the Industrial Chemical Division of Pittsburgh Plate and Glass Industries operates wells near Lake Charles in Calcasieu Parish, while Olin Corporation of Little Rock, Arkansas, has wells in Cameron Parish.

(4) Shell production. In the coastal areas of Cameron and Vermilion Parishes, shell is dredged by several companies. Dredging of shell banks is the chief method employed in shell production. Available shell resources are believed to be sufficient for present and future needs in the South Louisiana region. In 1975, about 10,489,000 tons of shell were produced in Louisiana.

(5) Carbon black. Production of carbon black in 1975 amounted to 888 million pounds. Louisiana ranks second in production behind Texas and accounted for 32.4 percent of the country's total. The total value of production was $102.7 million. The only carbon black plant located within the study area is operated near Ville Platte in Evangeline Parish. The Continental Carbon Company of Houston, Texas, operates a carbon black plant just outside the study area, west of Lake Charles.

e. Structural geology. Within the study area, the only significant large structures are salt domes and their related folds and faults. Only rarely are there any surface manifestations of these piercement structures. Local structure has no effect on topography or drainage since the entire study area is a portion of the vast Gulf Coastal Plain and is covered by fluvial deposits of Pleistocene and younger streams. Regionally, the study area lies adjacent to the actively deepening Gulf Coast Geosyncline. This structure is responsible for the thickening and tilting of strata to the south and east.

f. Ground water. In the study area, ground water is plentiful and only locally are problems of inadequate supply encountered. Communication between adjacent strata is such that subsurface water-bearing strata are regarded as a single, common aquifer. The depth to the base of the freshwater column varies from a few tens of feet to several hundred feet in the marshlands of southern Louisiana. Within this variable depth range are numerous aquifers, all considered to be hydraulically interconnected, and all are capable of fresh water production. The Evangeline aquifer is composed of sedimentary rocks of Pliocene age which occur throughout southwestern Louisiana. In the northern portion of the study area, this aquifer is near the surface and covered only by a thin veneer of Pleistocene deposits (Jones et al., 1954). Within the aquifer, sand beds are generally discontinuous; however, it appears that each sand bed is connected either above, below, or laterally with other beds, thus forming a single hydrologic unit. Sand beds, ranging in thickness from 3 to 115 feet, are very numerous. Near DeQuincy, in northern Calcasieu Parish, the Evangeline aquifer is nearly 1,000 feet thick and contains fresh water. Southward, in the industrial area near Lake Charles, it contains salt water throughout its entire thickness of about 2,000 feet. Permeability of sands in the Evangeline aquifer is generally lower than that in the overlying Chicot aquifer. Average specific capacity of 10 wells tapping the Evangeline aquifer in southwestern Louisiana ranged from 2 to 20 gallons per minute (gpm) per foot of drawdown (Harder, 1960). Evangeline water is very soft, slightly alkaline, low in chloride content, and free of excessive quantities of dissolved iron. Pleistocene sands of the Chicot aquifer are both

adjacent to and directly above the Evangeline aquifer. The thickness of these deposits increases southward to several thousand feet. However, the southern limit of fresh water is roughly along the margin of the Gulf of Mexico where the sands contain salty water below depth ranging from about 100 to more than 700 feet. Maximum depth of fresh water in these sand beds is about 1,000 feet in the east-central part of the area. (L.M.R.C.S.C.C., 1974, p. 508). The Chicot aquifer is the most extensive and heavily used aquifer in the study area. The individual sand beds generally grade coarser downward and have an average coefficient of permeability of about 1,500 gallons per day (gpd) per square foot. The varying thickness of sands causes a wide range of known coefficients of transmissibility for individual sands, less than 100,000 to about 1,000,000 gpd per foot. The transmissibility of the aggregate sand thickness is estimated to be greater than 1,500,000 gpd where the thickness of fresh water bearing sands is greatest. Although larger yields are possible, most large wells tapping the Chicot aquifer yield 3,000 to 4,000 gpm. Fresh water in the Chicot aquifer is a hard, calcium magnesium bicarbonate type, characteristically high in iron content. (L.M.R.C.S.C.C., 1974, p. 508).

g. Unusual geologic features. Significant geologic features in and adjacent to this basin area are expressed topographically in the form of domes, ridges, small "pimple mounds," relict beach ridges (cheniers), and ancient abandoned channels of the Mississippi and Red River systems. Older Pleistocene surfaces rise above the surrounding Holocene alluvium in the form of "islands" in the marshlands to the south, and rise as broad terraces farther inland toward the northern portion of the area. Most of these easily recognized surface features are located along the coastal marshlands and are considered unusual primarily because of their elevation in relation to the flat low-lying surroundings. Pimple mounds are circular mounds of earth, generally about 30 to 50 feet in diameter and ranging in height from about 1 foot to 5 feet which literally dot portions of the lower-most Pleistocene surface. The nature of their alinement, in rows parallel to drainage suggests that they may be of erosional origin; however, numerous theories have been advanced on their origin with no conclusive proof as yet. No economic value is assigned to the mounds; their use, except as soil or wildlife habitat, is not established.

2.03 HYDROLOGICAL ELEMENTS

a. Water areas. The Mermentau River is formed by the confluence of Bayous Nezpique and Des Cannes, from whence it flows 72 miles through prairie and marshland to the Gulf of Mexico. It traverses Lake Arthur, Grand Lake, and Lower Mud Lake. Above Lake Arthur, surface widths of the river channel vary from about 300 to 400 feet, with depths from 18 to 50 feet. Between Lake Arthur and the GIWW near the north end of Grand

Lake, width of the channel varies from about 500 feet to over 1,000 feet, with depths from 18 to 25 feet, except near the GIWW. Depths across Grand Lake from the GIWW to the Catfish Point Control Structure are about 4 feet. Below the control structure, the channel has been enlarged to a cross section of 3,000-square feet below mean low gulf (mlg). Generally this enlargement is to a depth of 15 feet over a bottom width varying from 80 to 170 feet, with the narrowest bottom width through Upper and Lower Mud Lakes. The controlling depth over the bar in the Gulf of Mexico at the natural mouth of the Mermentau is 4 feet.

b. Climate. Climate in the project area is influenced by its subtropical latitude and its proximity to the Gulf of Mexico. The mean annual temperature is 68.4 degrees F., with a low of 54.1 degrees for January and a high of 82.0 degrees for July and August. The maximum recorded temperature was 107 degrees, the minimum was 3 degrees. Mean annual precipitation is 58.26 inches. Average monthly precipitation ranges from about 4 inches in October to about 7 inches in July. The maximum monthly rainfall of 37.99 inches occurred at Lafayette in August 1940. Most stations recorded months with no measurable rainfall, the most recent being Kaplan in January 1971. The maximum annual rainfall of 106.64 inches occurred at the Rice Experiment Station, Crowley, Louisiana, in 1940, and the minimum of 27.13 inches was recorded at Lake Arthur, Louisiana, in 1917.

c. Tides. In this region, the tide is of semidiurnal character. The intracycle tidal range is 1.1 feet and the diurnal tidal range is 1.6 feet. There are periods when tidal variations are subordinate to other phenomena; such periods occur during hurricanes. The maximum tidal height of record was 12.2 feet above msl, which occurred at Grand Cheniere during Hurricane Audry, 27 June 1957. During the winter season, strong northerly winds may drive water from the marshes and depress nearshore water levels of the gulf by more than 3 feet.

d. Stages. Water surface elevations are available for the Mermentau River Basin at 13 locations with the earliest records beginning in 1938. Annual minimum and maximum water surface elevations and mean monthly elevations are contained in Appendix B.

e. Water quality of surface waters

(1) Introduction. For the purpose of this statement, the water quality of the Mermentau Basin will be discussed by stream segments. Eight segments have been delineated and are listed below. It should be noted that those areas comprising segments I, II, and V have not been

considered in this study. The segments are defined as follows:

Segment	Description
I	Bayou Nezpique from headwaters to confluence at Mermentau River (not considered in this study).
II	Bayou Des Cannes from headwater to confluence at Mermentau River (not considered in this study).
III	Bayou Plaquemine Brule' from headwaters to confluence at Mermentau River.
IV	Bayou Queue de Tortue from headwaters to confluence at Mermentau River.
V	Mermentau River from Mermentau, Louisiana, to Grand Lake including Lake Arthur (not considered in this study).
VI	Grand Lake, White Lake including Old Intracoastal Waterway west of Schooner Bayou Structure.
VII	Mermentau River, Grand Lake to the Gulf of Mexico.
VIII	Gulf approach channel.

(2) Criteria and standards. For the purpose of establishing standards, the Louisiana Stream Control Commission (LSCC) has divided water bodies within the Mermentau Basin into separate segments which generally coincide with those used in this statement. These segments and applicable criteria for each are shown in Table A-1. (All Tables and figures referenced in this section are in the Water Quality Appendix A). The explanation of the code for the designated water use is as follows:

A = Primary Contact Recreation
B = Secondary Contact Recreation
C = Propagation of Fish and Wildlife
D = Domestic Raw Water Supply

Water quality criteria established by the LSCC in its "1977 Louisiana Water Quality Criteria" are based on the designated use of the water in

that segment. In addition, water quality standards for all eight segments require that no oil slicks, or free or floating oil in sufficient quantities to interfere with designated water uses, be present; neither shall emulsified oils in the same quantity be present. Toxic material shall not be present in quantities alone nor in combination that shall be toxic to animal or plant life. As can be seen from Table A-1, no segment is designated as a domestic raw water source. All segments have been designated for uses B and C. In addition, all segments except III and IV have been designated for use A. The Environmental Protection Agency (EPA) published, in November 1980, new water quality criteria for toxic substances. In July 1976, EPA had published water quality criteria in its "Quality Criteria for Water." Additional EPA water quality criteria were contained in "Water Quality Criteria 1972". For comparative purposes, the EPA freshwater aquatic life criteria will be used in this statement for segments I through VI. The EPA criteria for marine water aquatic life will be used for segments VII and VIII. Both of these criteria are listed in Table A-2. Evaluations of Segments I through VII have been written pursuant to Section 404(b) of the Federal Water Pollution Control Act Amendments of 1972 (Public Law 92-500) and guidelines published by the EPA in the "Federal Register" of 5 September 1975. Evaluation of Segment VIII has been written with respect to the final "Revisions of Regulations and Criteria for Ocean Dumping" as published by the EPA in the "Federal Register" of 11 January 1977. Applications and authorizations for dredged material permits under Section 103 of the Marine Protection Research and Sanctuaries Act (MPRSA) for transportation of dredged material for the purposes of dumping it in ocean waters of the United States will be evaluated by the US Army Corps of Engineers in accordance with criteria set forth in Code of Federal Regulations (CFR) 209.120 and 209.145.

(3) Water quality data. Although historical data are available on the water quality of waters within the Mermentau Basin at several locations, these data have not been summarized. Long-term Corps of Engineers water quality sampling stations are indicated on Figure A-1 by a 5-digit designation. Available tabulated data corresponding to these sites are presented in Table A-4. There are no long-term water quality stations within the basin north of th GIWW. In February, July, and August 1975, and August and September 1976, a sampling program was accomplished for the inland portion of the project. The gulf portion of the project was sampled in March 1977. Water and sediment samples were taken to further characterize and assess the environmental impact of dredging activities within the project area. Results of the water quality and sediment sampling are shown in Tables A-5 through A-40, which are available in Appendix A. Tables A-5 through A-40 contain the water quality criteria listed in "Water Quality Criteria, November 1980". These water quality data have been summarized and are presented in Table 2. The sediment data have been summarized and are presented in Table 3, and the elutriate data (explained below) have been summarized in Table 4.

TABLE 2

MERMENTAU BASIN - HEAVY METALS NATIVE WATER

Parameter	SEGMENT I Site 2	SEGMENT I Site 25	SEGMENT II Site 1	SEGMENT II Site 26	SEGMENT II Site 174	SEGMENT III Site 27	SEGMENT III Site 28	SEGMENT IV Site 29	SEGMENT IV Site 30	SEGMENT V Site 3	SEGMENT V Site 4
Date	19 Feb 75	16 Jul 75	19 Feb 75	14 Aug 76	16 Jul 75	16 Jul 75		17 Jul 75		19 Feb 75	
Arsenic ug/l	-	1.54	-	1.81	.8	0.58	0.62	0.54	8.0	-	-
Cadmium ug/l	<50	0.20	<50	0.10	0.6	0.10	0.40	0.10	0.2	<50	<50
Chromium ug/l	<50	5.40	<50	81.00	5	6.20	6.30	7.40	6.9	<50	<50
Copper ug/l	<50	9.20	<50	27.10	6	8.00	6.90	5.90	4.2	<50	<50
Lead ug/l	< 200	0.50	<200	0.52	2.9	0.90	5.60	0.90	0.5	<200	<200
Mercury ug/l	1.87	0.90	2.10	0.09	<.1	0.10	0.07	1.10	1.6	1.06	1.26
Nickel ug/l	< 75	15.00	< 75	24.0	5	10.00	5.00	4.00	8.0	< 75.0	< 75.0
Zinc ug/l	74	17.90	47	15.8	24.7	13.60	18.90	12.50	31.4	34.0	8.1

Parameter	SEGMENT V Site 5	Site 6	Site 7	Site 8	Site 31	Site 32	Site 169	Site 170	Site 171	Site 172	Site 173	EPA* Criteria
Date	19 Feb 75				17 Jul 75				14 Aug 76			
Arsenic ug/l	-	-	-	-	0.46	0.38	0.3	1.2	1.1	.9	1.0	40
Cadmium ug/l	<50.0	<50.0	<50.0	<50.0	0.10	0.01	0.1	0.9	0.6	0.7	0.6	.025
Chromium ug/l	<50.0	<50.0	<50.0	<50.0	8.10	4.70	14	7	19	5	10	44
Copper ug/l	<50.0	<50.0	<50.0	<50.0	5.3	6.00	8	9	11	17	5	5.6
Lead ug/l	<200.0	<200.0	<200.0	<200.0	0.5	0.70	5.3	5.0	5.6	4.4	4.5	3.8
Mercury ug/l	1.38	1.21	1.62	1.18	0.07	0.10	0.2	.1	<.1	<.1	<.1	.20
Nickel ug/l	< 75.0	< 75.0	< 75.0	< 75.0	5.0	9.00	3	4	5	6	6	96
Zinc ug/l	85.0	67.0	63.0	44.0	12.9	-	4.4	44.6	54.0	24.4	2.6	47

*Freshwater aquatic life

Note: The underlined values indicate values or detection limit above criteria.

TABLE 2 (Cont.)

Parameter	Site 33	Site 34	Site 35	Site 36	Site 37	Site 38	EPA* Criteria	Site 39	Site 40	Site 175
	SEGMENT VI							SEGMENT VII		
Date	6 Aug 75				7 Aug 75			7 Aug 75		19 Sep 76
Arsenic ug/l	0.65	0.50	0.42	.54	0.45	0.54	40	0.65	0.77	1.4
Cadmium ug/l	0.05	0.05	0.01	0.10	0.4	0.20	.025	0.3	0.30	2.2
Chromium ug/l	12.00	10.5	16.3	18.3	10.8	8.8	44	4.5	6.80	11
Copper ug/l	3.30	12.0	5.6	12.2	3.3	4.50	5.6	5.3	4.0	9
Lead ug/l	0.90	0.7	0.6	1.1	0.7	0.70	3.8	0.9	1.9	25.7
Mercury ug/l	0.15	1.4	0.15	0.13	0.12	0.14	.20	0.11	0.11	<.1
Nickel ug/l	7.00	12.0	10.0	13.0	8.0	20.0	96	13.0	12.0	5
Zinc ug/l	12.40	33.3	18.6	10.5	10.9	5.6	47	14.9	4.80	122.6

Parameter	Site 176	Site 177	Site 178	Site 179	Site 180	Site 10	Site 11	Site 12	Site 13	Site 14
	SEGMENT VII					SEGMENT VIII				
Date	19 Sep 76					25 Mar 77				
Arsenic ug/l	4.2	1.5	3.5	1.0	.7	4	4	5	1	1
Cadmium ug/l	2.8	2.8	2.7	2.6	.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chromium ug/l	5	8	4	9	57	10	30	30	40	30
Copper ug/l	6	9	6	6	10	4	6	7	3	2
Lead ug/l	35.0	32.9	18.4	16.7	18.4	<0.5	13	16	7	7
Mercury ug/l	<.1	<.1	<.1	<.1	<.1	<0.05	<0.05	<0.05	<0.05	<0.05
Nickel ug/l	17	6	4	6	5	6	12	14	8	9
Zinc ug/l	54.7	46.8	25.3	26.0	47.4	30	60	60	40	30

TABLE 2 (Cont.)

Parameter	Site 15	Site 16	Site 17	Site 18	EPA Criteria**
Date		25 Mar 77			
Arsenic ug/l	1	2	1	1	-
Cadmium ug/l	<0.5	1	<0.5	<0.5	4.5
Chromium ug/l	30	10	20	40	18
Copper ug/l	3	4	6	4	4.0
Lead ug/l	5	-	-	5	25
Mercury ug/l	<0.05	<0.05	<0.05	0.2	.10
Nickel ug/l	8	7	7	7	7.1
Zinc ug/l	30	50	30	50	320

**Marine water aquatic life

TABLE 3

MERMENTAU BASIN - HEAVY METALS BOTTOMS SEDIMENT

	SEGMENT I		SEGMENT II			SEGMENT III		SEGMENT IV	
Parameter	Site 2	Site 25	Site 1	Site 26	Site 174	Site 27	Site 28	Site 29	Site 30
Date	19 Feb 75	16 Jul 75	19 Feb 75	16 Jul 75	14 Aug 76	16 Jul 75		17 Jul 75	
Arsenic ug/g	-	1.18	-	1.04	1.2	1.93	1.14	0.66	1.88
Cadmium ug/g	12.2	0.36	13	0.41	.03	0.05	0.154	0.07	0.44
Chromium ug/g	22.8	28.2	32	26.1	15	18.90	33.5	36.40	49.6
COD ug/g	110,500	84,500	111,400	127,000	76,800	35,200	81,300	153,000	196,000
Copper ug/g	18.0	18.2	13	24.2	3.4	6.74	14.9	11.00	20.8
Lead ug/g	500	25.3	46	20.7	1.2	9.44	15.8	20.30	32.9
Mercury ug/g	0.98	0.89	1.74	1.02	.05	0.53	0.77	1.02	1.05
Nickel ug/g	18.5	15.4	31	9.20	3.9	5.93	16.4	19.40	29.8
Oil & Grease ug/g	191	591	2,170	1,567	1,300	99	334	1,004	241
TKN ug/g	2,716	2,341	3,797	3,270	3,329	960	2,265	3,783	4,220
TVS ug/g	115,600	84,700	130,200	104,500	-	42,400	86,300	130,900	135,100
Zinc ug/g	42.3	-	49	88.90	42	48.9	110.2	65.90	73.6

Note: The underlined values indicate values or detection limit above proposed guidelines.

TABLE 3 (Cont.)

SEGMENT V

Parameter	Site 3	Site 4	Site 5	Site 6	Site 7	Site 8	Site 31	Site 32	Site 169	Site 170	Site 171
Date	19 Feb 75						17 Jul 75			14 Aug 76	
Arsenic ug/g	-	-	-	-	-	-	0.42	0.72	3.3	3.5	3.2
Cadmium ug/g	7.7	8.0	6.0	7.0	9.0	10.0	0.11	0.05	.01	.16	.03
Chromium ug/g	35.1	35.0	10.3	15.9	53.0	36.0	25.90	14.60	12	13	11
COD ug/g	49,900	58,700	9,050	13,700	53,300	57,300	126,500	124,000	27,200	86,800	11,090
Copper ug/g	15.5	20.0	15.1	20.3	34.5	10.0	9.45	4.99	11	8.5	14
Lead ug/g	31	32.0	24.0	30.0	40.0	40.0	17.1	8.24	5.9	7.8	4.9
Mercury ug/g	0.55	0.5	0.32	0.30	0.93	0.6	0.84	0.66	.21	.15	.05
Nickel ug/g	19.6	19.5	9.0	15.5	25.0	23.0	6.75	27.0	2.5	11	3.2
Oil & Grease ug/l	1,150	530	210	200	190	200	324	434	614	781	978
TKN ug/g	2,624	2,822	218	731	2,668	2,195	2,733	2,490	745	797	2.69
TVS ug/g	115,700	98,000	13,900	31,800	101,400	97,800	89,800	433,400	29,150	-	-
Zinc ug/g	64.7	49.3	23.8	44.6	8.1	56.0	-	-	13	49	

Parameter	Site 172	Site 173	Proposed Guidelines
Date	14 Aug 76		
Arsenic ug/g	1.7	1.1	5
Cadmium ug/g	.06	.04	2
Chromium ug/g	46	41	100
COD ug/g	31,430	76,300	50,000
Copper ug/g	21	20	50
Lead ug/g	12	15	50
Mercury ug/g	.01	<.01	1
Nickel ug/g	20	10	50
Oil & Grease ug/g	1,068	2,210	-
TKN ug/g	1,011	986	1,000
TVS ug/g	-	-	80,000
Zinc ug/g	95	100	75

Note: The underlined values indicate values or detection limit above proposed guidelines.

TABLE 3 (Cont.)

	SEGMENT VI					
Farameter	Site 33	Site 34	Site 35	Site 36	Site 37	Site 38
Date	6 Aug 75		6 Aug 75		7 Aug 75	
Arsenic ug/g	0.28	0.34	1.93	2.22	0.50	0.56
Cadmium ug/g	0.02	0.04	0.05	0.05	0.19	0.05
Chromium ug/g	23.80	11.90	35.3	25.10	24.2	34.9
COD ug/g	123,000	30,200	55,800	152,000	89,100	67,100
Copper ug/g	4.71	3.96	5.42	3.82	5.93	3.39
Lead ug/g	9.01	4.98	7.35	9.95	5.58	3.24
Mercury ug/g	0.68	0.50	0.80	1.03	1.07	1.43
Nickel ug/g	8.49	8.79	25.2	18.0	14.2	7.92
Oil & Grease ug/g	1,037	220	551	936	765	446
TKN ug/g	2,576	1,042	1,602	3,819	3,820	2,041
TVS ug/g	83,200	36,800	66,600	106,000	64,900	56,600
Zinc ug/g	57.50	42.5	47.0	60.3	34.4	31.9

TABLE 4

MERMENTAU BASIN - HEAVY METALS ELUTRIATE

Parameter	SEGMENT I Site 2	Site 25	Site 1	SEGMENT II Site 26	Site 174	SEGMENT III Site 27	Site 28	SEGMENT IV Site 29	Site 30	SEGMENT V Site 3	Site 4
Date	19 Feb 75	16 Jul 75	19 Feb 75	16 Jul 75	14 Aug 76	16 Jul 75		17 Jul 75		19 Feb 75	
Arsenic ug/l	-	0.73	-	0.56	1.5	0.73	0.69	1.03	22.0	-	-
Cadmium ug/l	<50	0.30	<50	0.10	0.4	0.10	0.20	0.10	0.1	< 50.0	< 50.0
Chromium ug/l	<50	1.30	<50	1.10	4	1.10	2.80	3.80	0.7	< 50.0	<50.0
Copper ug/l	<50	4.50	<50	11.70	14	8.10	4.20	2.40	7.3	<50.0	<50.0
Lead ug/l	<200	0.50	<200	0.50	0.5	0.50	0.90	0.50	0.7	<200.0	<200.0
Mercury ug/l	1.68	0.90	1.80	0.14	< .1	0.16	0.18	1.60	0.06	0.90	1.42
Nickel ug/l	< 75	4.00	< 75	36.0	21	16.00	4.00	2.00	22.0	< 75.0	< 75.0
Zinc ug/l	99	4.30	33	18.9	7.1	5.30	2.80	2.30	2.60	46.0	9.0

Parameter	Site 5	Site 6	Site 7	Site 8	SEGMENT V Site 31	Site 32	Site 169	Site 170	Site 171	Site 172	Site 173	EPA* Criteria
Date	19 Feb 75				17 Jul 75				14 Aug 76			
Arsenic ug/l	-	-	-	-	0.47	0.59	0.3	0.4	1.6	.7	.6	40
Cadmium ug/l	<50.0	<50.0	<50.0	<50.0	0.20	0.01	0.1	0.2	0.2	.4	0.3	0.025
Chromium ug/l	<50.0	<50.0	<50.0	<50.0	4.80	1.80	2	2	2	.7	5	44
Copper ug/l	<50.0	<50.0	<50.0	<50.0	5.2	7.60	6	13	9	17	6	5.6
Lead ug/l	<200.0	<200.0	<200.0	<200.0	0.5	2.10	0.6	0.8	<.1	0.8	.8	3.8
Mercury ug/l	1.08	1.19	1.46	1.46	0.05	0.13	0.1	0.1	<.1	< .1	<.1	0.20
Nickel ug/l	<75.0	<75.0	<75.0	<75.0	7.0	7.00	8	16.0	18	7	14	96
Zinc ug/l	11.0	13.0	11.0	31.0	4.8	-	9.3	8.0	8.4	3.8	4.8	47

* Freshwater aquatic life.

Note: The underlined values indicate values or detection limit above criteria.

TABLE 4 (cont.)

Parameter	SEGMENT VI Site 33	Site 34	Site 35	Site 36	Site 37	Site 38	EPA* Criteria	SEGMENT VII Site 39	Site 40	Site 175
Date		6 Aug 75			7 Aug 75			7 Aug 75		19 Sep 76
Arsenic ug/l	0.59	0.66	1.28	0.61	1.17	1.10	40	27.0	0.75	1.4
Cadmium ug/l	0.02	0.01	0.02	0.10	0.1	0.10	0.025	0.1	0.10	2.1
Chromium ug/l	4.80	1.1	0.50	0.50	0.5	1.30	44	0.5	0.50	1
Copper ug/l	13.30	19.20	2.0	2.3	1.4	6.90	5.6	2.8	4.80	2
Lead ug/l	0.70	1.3	0.50	0.50	0.5	0.70	3.8	0.5	0.70	32.6
Mercury ug/l	0.13	0.08	0.09	0.08	0.14	0.13	0.20	0.13	0.13	<.1
Nickel ug/l	29.0	19.20	68.0	30.0	32.0	34.0	96	27.0	13.0	6
Zinc ug/l	16.50	31.60	2.8	12.2	2.7	11.8	47	5.4	1.3	2.2

Parameter	SEGMENT VII Site 176	Site 177	Site 178	Site 179	Site 180	SEGMENT VIII Site 11	Site 14	Site 17	EPA** Criteria
Date			19 Sep 76				25 Mar 77		
Arsenic ug/l	1.4	.5	1.0	1.6	.4	2	2	1	-
Cadmium ug/l	1.5	2.2	2.3	2.4	.4	-	-	-	43
Chromium ug/l	1	4	4	1	2	1	1	2	18
Copper ug/l	2	1	2	2	3	3	3	2	4.0
Lead ug/l	31.8	24.0	13.2	15.7	14	-	-	-	25
Mercury ug/l	<.1	<.1	<.1	<.1	<.1	<0.1	<0.1	<0.1	.10
Nickel ug/l	5	4	6	5	4	3	5	4	7.1
Zinc ug/l	5.5	2.0	2.3	1.9	2.2	20	30	20	320

Source: USGS
Date: 25 March 1977
*Freshwater aquatic life
**Marine water aquatic life

(4) Elutriate data. Dredging polluted sediment has the potential for resuspending those pollutants in the waterway, thus adversely affecting water quality. Consequently, bulk sediment analysis alone is not a reliable method for completely predicting such potential water quality problems. The Corps of Engineers and EPA have developed an elutriate test which is designed to detect any significant release of chemical contaminants from dredged material. The test is designed to predict the effect on water quality attributed to the release of contaminants from the sediment to the water column. The elutriate is the supernatant resulting from vigorously shaking, for 30 minutes, one part bottom sediment with four parts water on a volume basis, followed by a 1-hour settling time and appropriate centrifugation and filtration.

(5) Evaluation

(a) Segment I - Bayou Nezpique. This segment was not considered in this study.

(b) Segment II - Bayou Des Cannes. This segment was not considered in this study.

(c) Segment III - Bayou Plaquemine Brule'. This stream segment has been classified as effluent limited (EL). There are four municipal sources which discharge into this segment. The largest of the discharges is the City of Crowley with an average flow of 1.79 million gallons per day (MGD) and a biochemical oxygen demand (BOD) of 714 pounds/day. The total flow to this segment is 1.98 MGD with BOD loading of 1,068 pounds/day. There are four known industrial sources which discharge into this segment. No data are available for two of these: Hercules, Inc., and Cleco Water Plant. The total known load for the remainder of the sources is less than 1 MGD with a BOD loading of slightly more than 100 pounds/day. Results of the analysis of samples taken within this segment indicate that the ambient water quality is fair with respect to the presence of heavy metals (see Table 2). Cadmium, copper, and lead were metals that exceeded criteria. Copper levels in sample numbers 27 and 28 were 8.0 ug/l and 6.9 ug/l respectively; this compares to the EPA criterion 5.6 ug/l. Cadmium concentrations at stations 27 and 28 were 0.10 ug/l and 0.40 ug/l, respectively, versus a value of 0.025 ug/l. Site 28 sediment showed a total volatile solids (TVS) concentration of 86,300 mg/kg. Chemical oxygen demand (COD) and total kjeldahl nitrogen (TKN) values at site 28 were 81,300 mg/kg and 2,265 mg/kg respectively. Both parameters are indicators of oxygen demanding substances. Zinc at site 28 measured 110.2 mg/kg. Elutriate values (see Table 4) indicate that two metals exceed EPA freshwater criteria. The cadmium elutriate values of 0.10 and 0.20 ug/l exceed the 0.025 ug/l chronic exposure criteria for freshwater life. Copper exceeded the criteria at site 27.

(d) Segment IV - Bayou Queue de Tortue. This stream segment has been classified as EL. There are no known municipal or industrial sources which discharge into this segment. Results of the analysis of samples taken within this segment indicate that the water quality is fair with respect to the presence of heavy metals (Table 2). Copper levels at sites 29 and 30 were 5.9 ug/l and 4.2 ug/l respectively, versus a 5.6 ug/l level. Mercury concentrations at sites 29 and 30 were 1.1 and 1.6 ug/l, respectively, versus an EPA criterion of 0.20 ug/l for freshwater aquatic life. Cadmium concentrations at sites 29 and 30 were 0.10 and 0.20 ug/l, respectively, versus a value of 0.025 ug/l. Sediment analysis (see Table 3) indicated mercury present in the sediments at concentrations of 1.02 ug/g and 1.05 ug/g at sites 29 and 30, respectively, exceeding the proposed guideline of 1.0 ug/g only slightly. COD levels at sites 29 and 30 were 153,000 mg/kg and 196,000 mg/kg. TKN levels at sites 29 and 30 were 3,783 mg/kg and 4,220 mg/kg, respectively. TVS levels at sites 29 and 30 were 130,900 mg/kg and 135,100 mg/kg, respectively. Elutriate values indicate copper levels of 2.4 ug/l and 7.3 ug/l at sites 29 and 30, respectively. Mercury concentration at site 29 of 1.60 ug/l exceeded the EPA freshwater criterion of 0.20 ug/l. Cadmium levels of 0.10 at each site were observed, in excess of the 0.025 EPA criterion.

(e) Segment V - Mermentau River. This segment was not considered in this study.

(f) Segment VI - Grand Lake, White Lake. This stream segment has been classified as EL. There are four municipal sources which discharge into this segment. Largest of the discharges is the City of Welsh with an average flow of 0.32 MGD and a BOD of 128.1 pounds/day. Total loading to this segment is 0.61 MGD flow and a BOD loading of 377.5 pounds/day. The only known industrial source which discharges into this segment, Amoco Production Company, has an average flow of 0.031 MGD with a BOD loading of 1 pound/day. Results of the analysis of samples taken within this segment indicate that the water quality is fair with respect to the presence of heavy metals (see Table 2). Sites 4 and 36 had copper levels of 12.0, and 12.2 respectively, versus a criterion of 5.6 ug/l. Site 34 had a mercury level of 1.4 ug/l versus an EPA criterion of 0.20 ug/l. Cadmium (total fraction) was present at sites 33, 34, and 36 through 38 at levels of 0.05, 0.05, 0.10, 0.40, and 0.20 ug/l, versus a criterion of 0.025 ug/l. Analysis of sediments indicates presence of mercury at sites 36, 37, and 38, and values of 1.03, 1.07, and 1.43 mg/kg, respectively. Values for sediment COD at sites numbers 33, 35, 36, 37, and 38 had values of 123,000 ug/g, 55,800 ug/g, 152,000 ug/g, 89,100 ug/g, and 67,100 ug/g, respectively. Sediment values for TKN at sites 33, 34, 35, 36, 37, and 38 were 2,576 ug/g, 1,042 ug/g, 1,602 ug/g, 3,819 ug/g, 3,820 ug/g, and 2,041 ug/g, respectively. Sediment levels of TVS at sites 33 and 36 were 83,200 mg/kg and 106,000 mg/kg, respectively. Elutriate values for six sites in segment VI

indicate that copper and cadmium are present in concentrations exceeding EPA criteria for these heavy metals. Copper was present at sites 33, 34, and 38 in concentrations of 13.3, 19.2, and 6.9 ug/l, respectively, versus a criterion of 5.6 ug/l. Cadmium was present at sites 36, 37, and 38 at levels of 0.10 versus a criterion of 0.025 ug/l. All other elutriate concentrations measured are within applicable EPA guidelines. Long-term data are available for this segment on temperature, pH, and dissolved oxygen. Average temperature values within this segment have remained relatively constant over the 4-year period of observation, 1973-1976, with the average temperature ranging from 16.0 degrees C. to 26.8 degrees C., varying only approximately 2 degrees C. between stations. However, a general cooling trend has been observed with the average temperature in 1973 being approximately 26 degrees C. and the average temperature in 1976 being approximately 17 degrees C. The minimum temperature observed for this period was 2.4 degrees C. for station number 76680 at Schooner Bayou Control Structure (west), observed in 1976. Warmest value observed was 34.1 degrees C. for station number 76690 at White Lake in 1973. The LSCC criteria for temperature is 32 degrees C. Average pH values over the 4-year period, 1973 - 1976, ranged from 7.4 to 8.2. Maximum pH value observed for this period was 9.7 for station number 76690 at White Lake near Schooner Bayou Canal in 1975. The minimum pH value observed for this period was 5.3 for station number 96122 at White Lake (at Canal on south side). The LSCC criteria for pH values are within a range of 6.5 to 9.0. Average dissolved oxygen values observed over the period 1973 - 1976 range from 7.6 mg/l to 9.1 mg/l. Maximum dissolved oxygen value observed was 12.5 mg/l for station number 76690 at White Lake in 1974. The minimum value observed was 0.7 mg/l for station 96129 at Grand Lake in 1975. Generally, all dissolved oxygen concentrations were above the LSCC criteria of 5.0 mg/l.

(g) Segment VII - Mermentau River - Grand Lake to Gulf of Mexico. This stream segment has been classified as EL. There are no known municipal sources which discharge into this segment. There are three industrial sources which discharge into this segment. Largest of the discharges is Tennessee Gas Pipeline with an average flow of 8.64 MGD. No data are available for one source, Dresser Magcobar. The total known flow for the remainder of the sources is 9.1 MGD. Results of the 1976 sampling program indicate that water quality is fair with respect to the presence of heavy metals (see Table 2). Lead was present at sites 175 through 177 in concentrations of 25.7, 35.0, and 32.9 ug/l, respectively, versus a 25.0 ug/l EPA recommendation (USEPA Water Quality Criteria 1980). Mercury was present at sites 39 and 40 (1975 sampling program) at levels of 0.11 ug/l at each site, versus a 0.10 ug/l criterion. The 1976 sampling program showed mercury levels at each of the six sites tested were all below the 0.10 ug/l detection limit. Copper was present at sites 39 and 175 through 180 at levels of 5.3, 9, 6, 9, 6, 6 and 10 ug/l,

respectively, versus an EPA recommendation of 4.0 ug/l (USEPA Water Quality Criteria 1980). Nickel concentrations were 13.0, 12.0, and 17.0 ug/l at sites 39, 40, and 176, respectively, compared to the EPA chronic exposure criterion of 7.1 ug/l. The chromium level at site 180 was 57 ug/l, compared to the criterion of 18 ug/l. Elutriate values for samples taken in 1975 (see Table 4) indicate mercury levels at sites 39 and 40 of 0.13 ug/l exceed the 0.10 ug/l EPA marine aquatic life criterion. Nickel levels at sites 39 and 40 were 27.0 and 13.0 ug/l, respectively. Elutriate values taken in 1976 indicate all metals tested, with the exception of lead and possibly mercury, were within EPA criteria. Lead concentrations at sites 175 and 176 were 32.6 and 31.8 ug/l, respectively, versus an EPA recommended limit of 25.0 ug/l. Mercury was not detectable at the 0.1 ug/l level at any of the sites. No pesticides were found in the elutriate. However, laboratory detection limits were above the applicable EPA criteria in two cases. Therefore, potential violations exist for chlordane and mirex. Long-term data are available on temperature pH, and dissolved oxygen. Average temperature values within this segment have remained relatively constant over the 3-year period of observation, 1973 - 1975, with the average temperature ranging from 21.5 degrees C. to 27.9 degrees C. Minimum temperature observed for this period was 7.1 degrees C. for station number 70875, Mermentau River at Upper Mud Lake, observed in 1975. Warmest value observed was 32.5 degrees C. for station number 70875 in 1973. The LSCC criterion for temperature is 35 degrees C. Average pH values over the 3-year period, 1973 - 1975, ranged from 7.3 to 8.3. Maximum pH value observed for this period was 9.7 for station number 70875, Mermentau River at Upper Mud Lake, observed in 1973. Minimum pH value observed for this period was 5.4 for station number 70875. The LSCC criterion for pH values is within a range of 6.5 to 9.0. Average dissolved oxygen values observed over the period 1973 - 1975 range from 7.8 mg/l to 8.7 mg/l. Maximum dissolved oxygen value observed was 11.6 mg/l for station number 70875 in 1973; minimum was 5.2 for station number 70875 in 1973. All dissolved oxygen concentrations were above the LSCC criteria of 4.0 mg/l.

(h) Segment VIII - Gulf Approach Channel. Results of the sampling program indicate that water quality is fair with respect to the presence of heavy metals. Copper concentrations at sites 11, 12, and 17 exceeded the EPA recommended limit of 4.0 ug/l. Values were 6.7 and 6 ug/l, respectively. Mercury at site 18 had a value of 0.2 ug/l, versus a 0.10 ug/l EPA criterion. The other sites showed no mercury levels above the 0.05 ug/l detection limit. Chromium concentrations at sites 11 through 18, except 16, were 30, 30, 40, 30, 30, 20, and 40 ug/l, respectively, versus an EPA recommended limit of 18 ug/l. Nickel, at site numbers 11 through 15, had levels of 12, 14, 8, 9, and 8 ug/l, respectively. Elutriate values (see Table 4) for all samples taken in

segment VIII indicated concentrations of all metals were within EPA marine criteria. Pesticide analyses were performed for elutriate mixtures (see Table 4). Pesticides were not detected for any of the tested parameters at any sample site. Laboratory limits for pesticides were above applicable EPA criteria in a few cases. Potential violations exist for chlordane, mirex, polychlorinated biphenyls (PCB's), and toxaphene. No long-term water quality data are available for this segment. In February 1979, channel sediments collected at three locations along the Mermentau Gulf Approach Channel were evaluated by bioassays and bioaccumulation tests (see Appendix C). The liquid and suspended particulate phase bioassays were conducted with postlarval mysid shrimp (Mysidopsis almyra), adult grass shrimp (Palaemonetes pugio), and sheepshead minnow (Cyprinodon variegatus). The solid phase bioassay and laboratory bioaccumulation assessment utilized the sandworm (Nereis virens), the Atlantic quahog (Mercenaria mercenaria) and grass shrimp (Palaemonetes pugio). Evaluative procedures were as established in "Ecological Evaluation of Proposed Discharge of Dredged Materials Into Ocean Waters" (EPA/CE, 1977). The results of these bioassays showed that sediments of the Mermentau River Entrance Channel pose no serious or unacceptable hazards to the marine environment. The complete bioassay/bioaccumulation report is on file at the New Orleans District and is available for review. Material which has shoaled within the channel to 2,000 feet (site 11) is primarily sand (75 percent), compared to 40 percent and 38 percent sand at disposal sites adjacent to the channel. Remaining material within the channel is 14 percent clay, compared to 38 percent and 32 percent clay at adjacent disposal sites, and 11 percent silt, compared to 22 percent and 30 percent silt at adjacent disposal sites. Material within the channel to 4,000 feet (site 14) is composed of: 41 percent clay, compared to 36 percent and 22 percent silt at disposal sites; and 24 percent sand, compared to 10 percent and 4 percent sand at disposal sites. Materials within the channel and adjacent disposal sites are substantially the same at 6,000 feet (sites 16, 17, and 18). Channel material is primarily clay (69 percent), with the remainder being 27 percent silt and 4 percent sand.

2.04 BOTANICAL ELEMENTS

a. General. The upper Mermentau Basin covers an area of approximately 1,700,000 acres, and, in general, consists of three terrain types: uplands supporting stands of pine, prairie devoted to rice and beef production, and marshland. Much of the area has been extensively cleared for agriculture and grazing. Stands of bottomland hardwoods and swamp forests exist along streams and on poorly drained depressions that interrupt the prairie surface. The lower basin includes nearly 700,000 acres, most of which is marshland, lakes, and ponds.

b. Uplands. Vegetation communities on upland regions of the Mermentau Basin are characterized by planted stands of loblolly and longleaf pines. Mixed hardwood stands occupy natural uplands; plants include water, live, blackjack, white and black oaks; ironwood; green ash; and sweetgum.

c. Prairie. Only small remnants of the original prairie grasslands which once covered large areas of the Mermentau Basin remain. Grasslands have yielded to agricultural cultivation, especially rice, soybeans, forage crops, and commercial pines.

d. Bottomland and swamp forest. Bottomland hardwoods and swamp forests occur as bands in basin floodplains. Bayous Nezpique, Des Cannes, Plaquemine Brule', Queue de Tortue, and the Mermentau River above Lake Arthur are bordered by bottomland hardwood forests and baldcypress-tupelogum swamp forests. Widths of these forested areas vary from a few feet to nearly 1-mile wide, with average widths approaching one-half mile. These areas comprise a significant percentage of remaining forested wetlands in Mermentau Basin. Dominant species in the seasonally-flooded bottomlands include water oak, ash, sweetgum, Drummond red maple, winged elm, bitter pecan, roughleaf dogwood, greenbriar, and rattan vine. Swamp forests predominately contain baldcypress, tupelogum, Drummond red maple, and buttonbush.

e. Marshland. Marshlands, covering nearly 434,000 acres (62 percent) of the lower basin, consist of four vegetation types: fresh, intermediate, brackish, and saline (Chabreck, 1972). Average water salinities, in parts per thousand (p.p.t.) are 0.7, 2.6, 4.1, and 14.6, respectively. Located north of the Catfish Point Control Structure and west of the Schooner Bayou Control Structure, where salinities are reduced, are the freshwater marshes, constituting more than one-half of the lower basin's marshes. Prevalent plant species include bulltongue, maidencane, water hyacinth, bagscale, Walter's millet, roseau cane, wiregrass, and alligatorweed. Collectively, these various species account for more than two-thirds of the plants found in this community. Much of the intermediate marsh is vegetated by wiregrass, alligatorweed, paspalum, sedges, and roseau cane. Brackish marsh is dominated by wiregrass, accounting for nearly one-half on the plant cover. Saltgrass, three-cornered grass, and widgeongrass also constitute a large portion of the vegetative cover in the brackish marsh. Saline marsh is limited in the project area to the lower reaches of the Mermentau River. The most abundant plant in the saline marsh is saltgrass, with oystergrass the subdominant. Collectively, these two species account for more than two-thirds of the vegetation in saline marshes. Other salt-tolerant

plants found in the saline marshes include black rush, saltwort, sea oxeye, saltmarsh aster, and glasswort. All the disposal sites, either virgin or those used during construction, contain marsh vegetation. The type of vegetation depends on the salinity of the site.

f. Elevated vegetation communities. Throughout the marshes are numerous elevated areas, including natural levees, dredged material disposal banks, and cheniers. These areas support a diverse flora, including trees and other vegetation characteristic of drier environments. Large trees include, but are not limited to, live oak, hackberry, American elm, prickly ash, persimmon, Chinese tallow, black willow, and chinaberry. Understory plants may include palmetto, blackberry, eastern baccharis, wiregrass, prickly pear cactus, salt cedar, and sweet acacia.

g. Open water. Water in the form of ponds, lakes, bayous, rivers, canals, and ditches covers 240,000 acres (34 percent) of the lower basin (Chabreck, 1972). Dominant plants in the numerous shallow ponds and lakes include duckweed, dwarf spikerush, coontail, watermilfoil, bladderworts, Nitella, white water lily, and the green alga Chara vulgaris. In the brackish and saltwater zone, these are largely replaced by widgeongrass. Phytoplankton of a wide variety inhabit all waters of the Mermentau Basin.

h. Historic vegetation studies. Prior to construction of the Catfish Point and Schooner Bayou Control Structures, vegetation of the areas was of a fresh-intermediate-brackish type, depending upon flood-flows passing down the Mermentau River and into Grand and White Lakes and distance from Vermilion Bay and the Gulf of Mexico. During high water periods, the vegetation would tend to become fresher; during low flow, more saline or brackish. It was noted by Gunter and Shell (1958) that oysters were known to exist in White Lake. Early vegetation studies (Penfound & Hathaway, 1938; O'Neil, 1949) discussed vegetation communities as they occurred at that time. Salt water ingress was accentuated by construction of the Old Intracoastal Waterway thru Grand and White Lakes in 1930 (Gunter & Shell, 1958). Placement of the control structures (1951) resulted in a stabilization of vegetation communities north of these structures and replacement of any brackish species present with those associated with fresher waters. Chabreck (1972) presented maps of the vegetation communities as inventoried in the mid-1960's. At that time, fresh marshes surrounded Grand and White Lakes with intermediate marshes extending from Grand Lake along the Mermentau River to Upper Mud Lake. On the east, intermediate marshes extended from the North Prong of Schooner Bayou to the western shores of Vermilion Bay. Broad areas of brackish marshes extended around the southern and eastern portions of Grand and White Lakes to Vermilion Bay, grading into a narrow fringe of saline marsh along the shores of the Gulf of Mexico. Chabreck and Linscombe (1978) revised the map by Chabreck, et. al. (1968), revealing significant changes in the vegetation

communities especially in areas not under the influence of the Catfish Point and Schooner Bayou Control Structures. Brackish marsh extends up the Mermentau River nearly to the Catfish Point Control Structure. Intermediate marsh appears to have widened its coverage east of White Lake at the expense of brackish marsh, while being reduced south and west of Grand Lake. Saline vegetation appears to have remained nearly steady in coverage along gulf shores.

i. Economic uses of plants of the project area. Among the bottomland hardwoods in the area may be trees of marketable size, but harvesting may prove impracticable due to their wide spacing. Baldcypress was once logged from the swamps, but only undersized, second growth trees are left in insufficient quantities to make harvesting practical. Spanish moss, once a popular stuffing for mattresses and couches, has been supplanted by man-made fibers. Pasture plants are grazed by cattle; marsh plants support winter grazing by cattle as well as resident and migratory waterfowl. Millet and other plants found in the fresh marsh are especially valuable to wintering waterfowl. Marshes and other wetlands furnish food and cover for commercial furbearers harvested for their pelts and meat. Project wetlands aid in maintenance of water quality. Phytoplankton and detritus from wetland decomposition make waters of the project area a rich nursery and feeding ground for important finfish and shellfish such as shrimp, crabs, crawfish, trout, flounder, menhaden, and others.

j. Recreational uses of plants of the project area. Within the projects' various vegetation communities - bottomland hardwoods, baldcypress-tupelogum swamp forest, and marshes - the predominant recreational activities are fishing, shrimping, crabbing, trapping, hunting, boating, and general enjoyment of the outdoors.

k. Wildlife uses of forests, swamps, and marshes. Mammals (e.g., deer, muskrats, nutria, rabbits, opossums, skunks, and small rodents), reptiles, amphibians, upland birds, and waterfowl consume or use for nesting materials a variety of plant life found in the project area. Fish directly consume aquatic plants; phytoplankton and detritus are the basis for the important marsh-estuarine food web.

l. Endangered and/or threatened species of plants. Several field trips during 1979 and 1980 and review of the literature revealed no rare or endangered species as listed in the "Federal Register" of 16 June 1976, and revisions through 20 May 1980.

2.05 ZOOLOGICAL ELEMENTS

a. Terrestrial fauna.

(1) Game and fur animals. Squirrels are found mainly in hardwood bottomlands and swamps. Muskrats are confined mainly to intermediate marshes; North American mink, Nearctic river otter, and raccoons

are found in both the bottomlands and marsh. Nutria concentrate in fresh marshes. Widely ranging game and fur animals include white-tailed deer, rabbits, and skunks.

(2) Nongame animals. Bottomlands support populations of the armadillo, opossum, and least shrew. Species of mice and rats, including the cotton mouse, hispid cotton rat, and marsh rice rat, arewidespread throughout the project area. Atlantic bottle-nose dolphins commonly occur in the lower reaches of the Mermentau River and in the nearshore gulf.

(3) Game birds. Game birds include fulvous whistling ducks, mottled ducks, rails, common gallinules, and wood ducks. Purple gallinules nest in fresh marshes of the area. Upland game species include bobwhite quail and mourning dove. Both are much sought after species which are managed by state and Federal wildlife management agencies. Migratory waterfowl in the project area include primarily winter residents such as snow geese, and various ducks such as mallard, northern pintail, blue and green-winged teal, American widgeon, ring-necked duck, and lesser scaup. Adjacent rice fields provide food supplies for many species overwintering in southern Louisiana. The fresh marshes are heavily utilized by these birds. Other migratory game species include American woodcock, Virginia rail, American coot, and common snipe. Waterfowl biologists from the Fish and Wildlife Service (FWS) have estimated that peak populations of 750,000 to 1 million ducks, 125,000 lesser snow geese, and 22,000 white-fronted geese winter in the Mermentau Basin.

(4) Non-game birds. The diversity of habitats in the pro ject area offers excellent cover, nesting, and feeding sites for many non-game birds. Of the 400 or more species of birds recorded for Louisiana (Lowery, 1974), most can be found in the project area. Coastal and water-oriented birds may be found in almost all sections of the system. Grebes, herons, bitterns, egrets, and ibises inhabit waterways and marshes, principally in freshwater areas. Other water-oriented birds include plovers, white pelicans, gulls, terns, black skimmers, and belted kingfishers. Common marsh songbirds include wrens, red-winged blackbirds, boat-tailed grackles, and sparrows. Disturbed and woodland areas are home for hawks, vultures, owls, woodpeckers, jays, flycatchers, robins, vireos, crows, Carolina chickadees, northern mockingbirds, European starlings, common grackles, house sparrows, and cardinals. Coastal Louisiana is a major staging area for songbirds migrating along or across the Gulf of Mexico. The project area includes seven colonies inhabited by seabirds and wading birds.

(5) Reptiles and amphibians. Nearly 100 species of reptiles and amphibians occur in coastal Louisiana, most of which could be expected to occur in the project area. Common amphibians of wet areas include sirens, amphiumas, newts, bullfrogs, and pig, bronze, and leopard frogs. Reptiles occupying wet habitats are the American alligator, various turtles, water snakes, king snakes, and cottonmouths. Reptile and amphibian

species commonly found in the higher elevations include terrestrial salamanders, toads, tree frogs, box turtles, green anoles, skunks, racers, rat snakes, and copperheads.

(6) Insects.

(a) General. Insects of the project area occupy all habitats and are important in many food webs occurring in southwestern Louisiana. Many commercial and sport fishes, small mammals, reptiles, and amphibians depend on the numerous and varied insects as a major food source. Orders of insects dependent upon water for their development include, but are not limited to, mayflies, beetles, flies, bugs, and dragonflies. Various species found in water are important components of food webs in aquatic environments. Flying insects include dragonflies, damselflies, butterflies, and moths. Numerous beetles occupy many habitats. Fleas are also found in the project area.

(b) Vector problems. Infectuous equine anemia (swamp fever), anaplasmoses, and Venezuelan equine encephalitis are diseases found in the project area. Eastern encephalitis and St. Louis equine encephalitis pose additional disease threats. Considerable vector potential exists in the project area. Various strains of viral encephalitis are periodically found in native and migratory waterfowl populations. These may serve as sources for viral inoculum for future outbreaks. Increased mosquito population densities could enhance rates of disease transmission should local outbreaks occur.

(7) Spiders and ticks. Spiders and ticks occur throughout the project areas. Ticks are vectors of Rocky Mountain spotted fever and Texas cattle fever.

(8) Sport, commercial, and esthetic uses of wildlife species in the project area. Excellent sport, commercial, and esthetic opportunities are provided Louisiana residents and visitors in the project area. Most of this activity is wetland dependent. Fur trapping in south Louisiana is a multimillion dollar business, with nutria and muskrats comprising a major percentage of the total harvest. Meat of muskrat and nutria is sold for pet food and as food for south Louisiana mink farms. Alligators are hunted in the area; a season was held in 1979. Trapping yields approximately $2 million to local residents annually. Rabbits, squirrels, and white-tailed deer are common. These species, as well as raccoon and opossum, are consumed locally as food. Birds, both game and non-game, consume large quantities of destructive insects; prey on small rodents, various reptiles, and amphibians; consume quantities of weed seed, and remove carrion. Waterfowl are important seasonally, with hunting providing a high percentage of outdoor recreational opportunities in the project

area. Vast expanses of marsh, open water, and flooded forest offer an escape from civilization and provide freedom to birdwatchers and naturalists who utilize these areas. Birdwatching, nature photography, and naturalizing are important avocations for many people in the project area.

(9) Threatened and/or endangered species. Various animals and birds classified as threatened or endangered are found in the project area. The only substantial populations of the endangered red wolf in Louisiana occur in the western portions of Cameron and Calcasieu Parishes. The southern bald eagle may at times visit the project area during feeding or migratory flights, but no nesting pairs are known. The peregrine falcon occurs in the project area, especially along the gulf coast. The red-cockaded woodpecker is another possible inhabitant of the area. Ivory-billed woodpeckers prefer old, isolated bottomland hardwood forests; their existence in the project area is questionable. This species was last observed in Louisiana in 1943 and may be close to extirpation in the state. The brown pelican once was a prominent inhabitant of the gulf coast of Louisiana. After a swift and complete decline of the species in the 1950's and 1960's, some birds were introduced from Florida and reestablished in eastern Louisiana. However, in 1975, the brown pelican population suffered a significant decline in numbers, presumably because of accumulations of chlorinated hydrocarbons assimilated from its food organisms. The American alligator has been reclassified in Louisiana from endangered to threatened due to similarity of appearance. Limited harvests have been permitted in the project area. Bachman's warbler is another possible inhabitant of the project area. One was sighted in Cameron Parish in 1976. In the hardwoods of the northern portion of the project area, the Florida panther is a possible inhabitant; however, there are no known recent sightings.

b. General description of aquatic animals in area.

(1) Stream-lake fishes and zooplankton. Like most river, lake, and stream systems of south Louisiana, areas north of Catfish Point Control Structure have a fauna characteristic of slow flowing, fresh, turbid streams. Some saltwater species are present; however, the majority of the fish are freshwater. The major freshwater sport fishes of the area include largemouth bass, white crappie, black crappie, bluegill, redear sunfish, and warmouth. Many of these species are abundant in the canals found in the marshes of the project area. Commercial fishes occurring in the project area include blue, channel, and flathead catfish; yellow bullhead; smallmouth buffalo; carp; gar; and freshwater drum.

(2) Estuarine fishes and zooplankton. The classic study of the organisms of the lower Mermentau Basin by Gunter and Shell (1958) before the water control structures were in effect revealed that, both in numbers and in species, marine and estuarine organisms dominated over freshwater species. This was confirmed by Morton (1973). Since the

water control structure at Catfish Point became operational, estuarine conditions in the project area are generally limited to below the control structure. Estuarine species, though not in great abundance, which occur above the water control structures include: gulf menhaden, bay anchovy, sand and spotted seatrout, spot, Atlantic croaker, striped mullet, bay whiff, and hog choker. Estuarine fish found below the structures include the above as well as sea catfish, gafftopsail catfish, Atlantic needlefish, red and black drum, and rough and tidewater silversides. Shrimp spawn in the gulf and the young shrimp are carried by the tide into the marshes and estuaries where they mature and return to the gulf as young adults. Closing off Grand and White Lakes has interrupted this cycle. However, operation of Schooner Bayou and Catfish Point allows ingress of the young shrimp and they then grow to maturity in the lakes. Menhaden spawn in the gulf in late fall and the larvae enter estuarine areas during the spring where they concentrate in low salinity areas. As they grow, they move gulfward and finally move to the gulf in the fall. Juvenile spotted seatrout also utilize low salinity estuaries as nursury areas and move toward the gulf as they mature. Copepods are the most common zooplanktons; arrowworms, ctenophoves, and crab larvae are also present.

(3) Benthic invertebrates. Brackish water clams (road clams) were once common in White Lake, but populations appear to have decreased since water control structures were put into operation, reducing salinity levels. Other bivalves which might occur in the project's brackish to saline areas include the razor clam, ribbed mussel, and oyster. Oysters occur sparsely on wharves, pilings, and docks around Grand Chenier. Commonly occurring snails include the marsh periwinkle, coffee melampus, and smooth periwinkle. These species occur on stems of emergent marsh plants as well as the marsh floor. The oyster drill prefers high salinity waters but may be found near the mouth of the river. Crustacean species include commercial quantities of shrimp, crabs, and crawfish. White shrimp and brown shrimp occur in saline and brackish reaches of the river, with white shrimp also in Grand and White Lakes. Crawfish prefer fresh waters, and are found in fresh marshes, wooded swamps, and adjacent rice fields. Crabs of various species are found in the project area. Blue crabs occur from fresh water to oceanic, feeding on other crustaceans, molluscs, and organic detritus. Other crabs include stone crabs, mud crabs, and fiddler crabs. The bar channel and disposal area for the bar channel is inhabited by echinoderms, anemonies, polychaetes, and molluscs such as the arba and nassa. Various groups such as amphipods, nemerteans, ostracods, and mantis shrimp are also represented. Since the channel is dredged every 2 years, it and the disposal area have fewer benthic organisms than adjacent undisturbed water bottoms. Fly larvae, worms, and small crustaceans dominate the benthos in fresh to brackish waters. Insect larvae and nymphs also make up a major portion of the freshwater benthos.

(4) Use of aquatic organisms. Important commercial fish species of the project area include catfish and bullheads, buffalo, carp, gar, freshwater drum, white shrimp, and blue crabs. According to fisheries statistics for Grand Lake and White Lake, compiled by the National Marine Fisheries Service (NMFS) for the years of 1963 through 1975, the average annual catch was 336,700 pounds worth $35,700. In recent years the total catch has declined drastically (from 430,800 pounds in 1964 to 163,800 pounds in 1975). Since 1976 it has been impossible to report catch data from Grand and White Lakes alone because NMFS changed their reporting categories. Between 1963 and 1975, the only estuarine species caught in Grand and White Lakes was blue crabs and the catch was spotty: 11,400 lbs. in 1971; 110,200 lbs. in 1972; and 1,200 lbs. in 1975. In 1972 when Catfish Point Control Structure was opened to allow access to juvenile estuarine organisms, USFWS reported 200,000 pounds of shrimp caught. A similar opening in 1976 allowed the catch of an estimated 472,000 pounds of white shrimp and 350,000 pounds of blue crabs were harvested (USFWS data). The USFWS estimates that the annual harvest from Grand and White Lakes could be 120,000 pounds of shrimp and 224,000 pounds of crabs if the control structures were operated to allow ingress of marine organisms. In addition, they estimate that proper operation of the structures could add 976,000 pounds of shrimp annually to the offshore catch. Between 1963 and 1977, the average annual catch offshore from the Mermentau Basin (Shrimp Grid #16) was 36,424,000 pounds worth $9,506,000. Menhaden and shrimp were the major species. The catch ranged from approximately 5,418,000 pounds in 1964 to 89,770,000 pounds in 1966. Values ranged from a low of $2,089,000 in 1964 to a high of $22,500,000 in 1976.

(5) Sport fishing. Saltwater fishes sought by sportsmen include spot, red and black drum, Atlantic croaker, spotted and sand seatrout, flounder, sheepshead, and kingfish. Freshwater sportfish, such as largemouth bass, bluegill, warmouth, black and white crappie, striped bass (stocked by the Louisiana Department of Wildlife and Fisheries in 1972), blue and channel catfish, and yellow bullheads are fished for in Lacassine Pool at Lacassine National Wildlife Refuge, the numerous marsh lakes bordering Grand and White Lakes, the Big Burn marsh north of Little Cheniere, Lake Arthur, and the larger, unchannelized stream segments in the area, including the Mermentau River.

(6) Food web. Phytoplankton and detritus from the marshes furnish the base of the food web. Zooplankton feed either on these or on each other. Benthic invertebrates are deposit- or filter-feeders, scavengers, grazers, or carnivores. Freeswimming macroscopic invertebrates also play various roles in the food web. Small fish that live in the shallows (such as killifish, minnows, and the young of the croaker, spot,

menhaden, and anchovy) are preyed upon by larger fish, and many eat zooplankton and detritus. In deeper waters there are adults of the fish mentioned above, as well as flounder, seatrout, and sharks that are consumers in the food web.

(7) Esthetics. The area has a rich population of aquatic organisms, and the species diversity is of importance to naturalists.

(8) Endangered or threatened species. Offshore waters south of the project area provide habitat for sei, fin-backed, and sperm whales. The Florida manatee could be an occasional visitor to the area. Three species of sea turtles, the hawksbill, Atlantic ridley, and the leatherback are listed as endangered; and the green and loggerhead sea turtles are considered threatened.

2.06 MISCELLANEOUS ELEMENTS

Two wildlife refuges are located in the basin. The 31,124 acre Lacassine Migratory Waterfowl Refuge is a Federal preserve. The 83,000 acre Rockefeller Wildlife Refuge and Game Preserve is state-owned. Neither refuge will be altered by maintenance of existing projects.

2.07 CULTURAL RESOURCE ELEMENTS

a. Archeological and historical overview

(1) Prehistory. Prehistoric cultural materials from the Mermentau Basin are distinct from those in the Mississippi alluvial valley to the east and the Sabine River Basin to the west. Projection of cultural sequences, typical of the "Red River Mouth" area or of the coastal zone itself, would be inconsistent with the locally unique materials. Cultural remains indicate that prehistoric peoples of the Mermentau Basin were chronologically and developmentally depressed when compared to adjoining areas. Archeological sites in the basin seem to range in time from the Middle Archaic period to the historic American period, but a complete chronological culture sequence has not been formulated due to the distinctiveness of the archeological remains.

(2) History. The native historic people of the Mermentau Basin were the Mermentau band of the Attakapas. The three Attakapas bands of Southwestern Louisiana together with the linguistically and culturally affiliated Akokisas, Bidias, and Eadose groups in southeastern Texas constituted "The Provincial Attakepans." The limited ethnographic information on "The Provincial Attakepans" describes these people as one of the most primitive to be found in North America. The Attakapas culture was basically Archaic. They failed to assimilate many subsequent technological and economic advancements from more progressive regions, where Archaic lifeways came to an end during the last pre-Christian millennium. The entire culture area is often referred to as a "cultural sink," an area that progress seemingly forgot. In January of 1765, a

party of Acadian French expelled by the English from Nova Scotia arrived in New Orleans. The Spanish Government of Louisiana gave them aid and sent them west to settle. The Acadians settled on the prairies and along the bayous and chenier ridges of southwest Louisiana and became small farmers, herdsmen, and fishermen. This was the beginning of the unique "Cajun" culture of southwestern Louisiana. Between 1765 and 1790, up to 10,000 Acadian French immigrated to the Spanish colony of Louisiana. The pastoral Cajuns grew rice, primarily for family use, in low spots where irrigation was not necessary. Due to the heavy dependence on rice for subsistence and necessary rain for cultivation, rice was called the "Providence crop." This situation began to change in the early 1800's with the immigration of Midwesterners who realized the potential of the prairies of southwestern Louisiana. With the introduction of the vacuum pump and canal system in 1894, irrigation transformed rice cultivation from a "Providence crop" into a major industry. Louisiana's oil industry began in 1901 with the first successful oil well in September 21, 1901, near Jennings. By the end of 1904, the Mamou Field (later called the Evangeline Field) had 33 producing wells in operation.

b. Status of cultural resources survey. The Bayou Plaquemine Brule' and Bayou Queue de Tortue projects involve only clearing and snagging, no dredging is required; therefore, no cultural resource surveys are necessary. The Mermentau River - Gulf of Mexico Navigation Channel, Louisiana bar channel, project involves maintenance dredging of an existing navigation channel and, therefore, requires no cultural resources investigation. The lower Mermentau River from Grand Lake to the Gulf of Mexico segment of the Mermentau River, Louisiana, project was subject to a survey, via helicopter, on February 14 and 25, 1975, by Robert W. Neuman, curator of Anthropology at Louisiana State University. Mr. Neuman's survey located five archeological sites within or near the project area. Subsequently, an intensive cultural resource survey of the Mermentau River from Grand Lake to the Gulf of Mexico was conducted in 1980 by Texas A&M University. The draft report and recommendation is currently in preparation. None of the other four separate segments of the Mermentau River project has been covered by intensive on-the-ground cultural resources survey. Prior to the next maintenance activities on any or all of the four remaining segments of the Mermentau River project, an intensive on-the-ground cultural resources survey will be performed of the project impact areas. Any cultural resource listed on the National Register of Historic Places or found eligible for inclusion in the National Register, and to be adversely impacted by the project, would be either avoided, protected, or, in the absence of a feasible alternative, excavated.

(1) Archeological resources. Over 70 prehistoric and historic sites are known to exist along waterways in the Mermentau Basin. The basin itself is environmentally segmented both from valley wall to valley wall and linearly from the Southwest Louisiana Prairie zone to the coastal marsh zone. Site analyses indicate settlement specificity and adaptive differences from environment to environment. Three principal divisions in settlement ecology occur in the area: (1) Rangia-collecting sites along the shores of Lake Arthur and in the marshes along the Lower Mermentau River; (2) Rangia-collecting sites along the wet hardwood areas of the Mermentau River from Lake Arthur north to just above the mouth of Bayou Queue de Tortue; and (3) sites, lacking Rangia middens, which

occur principally along the dry hardwood cutbanks of the upper Mermentau River and Bayous Nezpique and Des Cannes. No archeological sites are recorded for the project reaches of Bayou Plaquemine Brule' and Bayou Queue de Tortue. There are a total of 10 archeological sites recorded along the five separate segments of the Mermentau River project, although none of the project has been covered by on-the-ground cultural resource surveys. Located on the Lower Mermentau River from Grand Lake to the Gulf of Mexico segment of the project are seven Rangia shell middens. There are two recorded sites along the Grand Lake to White Lake Inland Waterway segment of the project. An archeological site is recorded along the White Lake to Vermilion Bay Inland Waterway segment. No archeological sites are recorded in the project area of either the North Prong of Schooner Bayou segment or the White Lake to Pecan Island Waterway segment of the Mermentau River, Louisiana, project.

(2) Historical resources. The beginning of the oil and gas industry in Louisiana is represented by a replica of the first successful oil well rig and the first oil refinery in the state located in Jennings, Louisiana. A replica of Jennings Oil Company Rig Number 1, Jules Clement, which first struck oil on September 21, 1901, is located in the Town of Jennings, Louisiana. Also found in Jennings is one of the original buildings which housed Louisiana's first oil refinery, built in 1903. In the coastal marsh along the Lower Mermentau River are numerous parallel chenier ridges or islands in the marsh which offer high ground suitable for habitation. The earliest settlement in the areas was on Cheniere Perdue Ridge just west of the Mermentau River. Several historic houses and cemeteries are found on the ridges which are dotted by large moss-draped live oak trees. All these historic resources are located well outside of project areas.

c. National Register sites. The National Register of Historic Places as published in the "Federal Register" dated 6 February 1979 and the weekly supplements through 7 April 1981 have been consulted, and no National Register properties are listed which would be affected by the proposed actions.

2.08 ECONOMIC ELEMENTS

a. Area of impact. While the environmental effects of the projects under study may be limited primarily to the immediate vicinity of the Mermentau Basin, our modern transportation systems, technology, financial institutions, and many other factors have tended to cause a diffusion of direct and indirect economic effects reaching considerably beyond the immediate vicinity of the projects. Much of the traffic moving on the Mermentau River has been crude petroleum, produced in area fields then barged to other locations like Beaumont, Texas, (and beyond) for processing. Soybeans produced in the upper basin are barged down the Mermentau then eastward on the GIWW to grain elevators on the Mississippi River to international markets. Hence, the location of income, employment, and other economic effects of the project extend well beyond the

Mermentau Basin. However, for purposes of this report, the "area of economic impact" has been limited primarily to the seven-parish area in which the Mermentau River Basin is located, namely: Acadia, Allen, Cameron, Evangeline, Jefferson Davis, St. Landry, and Vermilion Parishes.

b. General economic profile

(1) Economic development and transport of natural resources are the primary purposes for maintaining the projects. While agriculture, forestry, and fisheries remain significant sources of employment and income, manufacturing, mineral production, and construction activities have become increasingly more important since World War II. The latest (1975) available statistics on commercial forest production indicate that landowner income from the sale of timber, most of it pine cut from upland areas, along with some oak, gum, and other hardwoods, totaled $5 million or about 5 percent of the state total. Preliminary reports of the latest (1974) Census of Agriculture estimate the total value of agricultural products sold at $261 million -- $242 million of it from the sale of crops. Most of it was rice and soybeans. The value of crops sold in this seven-parish area was 27 percent of the state total of which the land in farms was about 21 percent. The $19 million value of livestock and livestock products sold was about 7 percent of the state total. Importance of agriculture, fisheries, and forestry to the local economy can be further illustrated by the relative amount of employment in these industries. The 1970 Census reported employment in these industries to be 9,200, more than 12 percent of all jobs in the area compared with 4 percent in the rest of the state. Area employment in mineral production was estimated to be 6,200 or 8 percent of total employment. Jobs directly related to mineral production accounted for slightly less than 4 percent in the rest of the state. At unadjusted price levels, the value of mineral production in the Mermentau economic area increased from $262 million in 1958, to $533 million in 1965, to $1,407 million in 1964 - about 17 percent of the value of mineral production in the state. The 1958 figure was approximately 1.6 percent of the value of minerals produced nationally. The figure for 1974 was 2.5 percent of the value of US mineral production. The dramatic increase has resulted largely from the increased price and production of natural gas and oil. The following tables illustrate movements on the waterways. Waterborne commerce on the Bayou Queue de Tortue waterway has been very light and was not reported in the 1975 edition of Waterborne Commerce of the United States. Some freight moving on the waterways has been related to construction and development of manufacturing industries; however, most of it has been outbound crude petroleum.

(2) Manufacturing and commercial development. Although the economic area has abundant sources of energy, it remains substantially rural with relatively light manufacturing and with no large commercial centers. An estimate based on the 1972 Census of Manufacturers indicates that manufacturing employment in 1972 was about 6,600. This figure was

less than 4 percent of the state's manufacturing employment. The value added by manufacture was an estimated $101 million, slightly more than 2 percent of the state total. Much of the manufacturing employment was in the processing of food and kindred products (including rice and seafood) and lumber and wood products. Wholesale and retail sales and services receipts also account for a relatively small part of the state total. The 1972 Censuses of Business estimated wholesale trade to be $394 million (5.5 percent of sales statewide), and receipts of selected service industries at $39 million (2.6 percent of the state total).

MERMENTAU RIVER, LA.[1]

Comparative Statement of Traffic

Year	Tons	Year	Tons
1967	981,755	1972	1,318,809
1968	624,762	1973	1,507,559
1969	632,928	1974	1,391,941
1970	843,787	1975	1,336,711
1971	1,029,602	1976	1,088,189

BAYOU PLAQUEMINE BRULE', LA.[1]

Comparative Statement of Traffic

Year	Tons	Year	Tons
1967	95,296	1972	69,174
1968	82,138	1973	59,958
1969	69,860	1974	17,465
1970	81,541	1975	8,580
1971	76,684	1976	9,807

[1]Source: US Army Corps of Engineers, Waterborne Commerce of the United States, 1976. Part 2, previous issues of this publication, and unpublished data.

(3) Employment, income, and population. Although the development of mineral industries has to some extent replaced agriculture as a source of employment, unemployment in the economic area has been relatively high, incomes low, and population relatively static. All seven parishes have qualified for grants under the Public Works and Economic Development Act of 1965 based either on "substantial unemployment," "substantial and persistent unemployment," or on the "decline in per capita employment." In 1975, the annual average rate of unemployment in the economic area was 8.3 percent, while it was 7.4 percent statewide. The latest estimate (1974) by the US Bureau of Economic Analysis indicates that per capita personal income in the seven-parish area was about $3,800 while the figure for the state was $4,390. Per capita personal income in the US was $5,490. Employment and income trends through 1970 have resulted in only nominal population growth. From 1940 to 1975, the population of the Mermentau Economic Area increased from 234,900 to 278,100 or about 18 percent. During the same period of time, the population of the state increased by about 66 percent.

2.09 FUTURE ENVIRONMENTAL CONDITIONS OF THE PROJECT AREA WITHOUT OPERATION AND MAINTENANCE OF EXISTING PROJECTS.

Without maintenance of the existing projects, the basin area would be more susceptible to flood damage; the potential for saltwater intrusion into rice-growing areas would increase; value of their reservoir functions would be diminished; and economic value of the basin's navigation channels would decline. The most significant impacts of halting Federal maintenance of the projects (assuming other interests would not maintain the projects) would be the effects from siltation at the mouth of the Mermentau River. If effectiveness of navigation routes through the basin were significantly reduced, not only would the regional economy suffer, but that of the rest of the nation depending on petroleum produced in the basin would also be affected, either by higher transportation costs or possible scarcities. The United States became acutely aware of its fuel-short situation when the Organization of Petroleum Exporting Countries (OPEC) nations imposed their oil embargo in 1973. The second most important commodity shipped on the waterways has been shell for use by construction industries. Without project maintenance, heavy damage could result to rice production due to saltwater intrusions during dry periods; losses could extend over tens of thousands of acres and amount to millions of dollars. Other impacts of no longer maintaining the projects would be of a more local nature. Overall, employment and income could decline and people could be forced to relocate outside of the basin. Cessation of maintenance; i.e., dredging for flood control and navigation, and the operation of water control structures at Catfish Point and Schooner Bayou would, in general, prevent destruction of aquatic and terrestrial habitat and would result in a return to estuarine conditions in White and Grand Lakes if the two water control structures are not operated; i.e., left to remain open the year around. Specifically, saltwater commercial fishing would

increase significantly, both inshore and offshore by restoring White and Grand Lakes to an estuarine system. Waterfowl and furbearer production would also be increased due to lowered water levels in the marshes and by not destroying habitat by the deposition of dredged material. In this case, it can be assumed that production of white shrimp and blue crabs would be comparable to the average production of these organisms for western Louisiana estuaries. The approximately 83,000 acres of White and Grand Lakes would add about 1,095,000 pounds of white shrimp (119,420 pounds inshore harvest and 976,180 pounds offshore harvest) to the annual commercial harvest in coastal Louisiana. Similarly, an estimated 224,100 pounds of blue crabs would be added to the annual harvest. Sport shrimping and crabbing would also significantly increase as a result of leaving the water control structures open. Cessation of clearing and snagging would slowly increase the productivity of Bayous Plaquemine Brule' and Queue de Tortue as aquatic habitat diversified.

SECTION 3--RELATIONSHIPS OF THE PROPOSED ACTIONS TO LAND USE PLANS

3.01 LAND USE PLANS FOR THE AREA OF THE PROJECTS

a. Land use plans. Plans for the area of the projects have been prepared by the Imperial Calcasieu Regional Planning and Development Commission (ICRPDC) and the Acadiana Planning and Development Commission (APDC). Areas in the lower Mermentau River and around Grand and White Lakes, are designated as undevelopable in both ICRPDC and APDC land use plans. The Upper Mermentau River and various project bayous are also designated as undevelopable, their headwater floodplains vegetated by riverbottom hardwood forests. These areas are not recommended for either urban or industrial developments. Areas near cities and highway crossings over project waterways potentially may be used for further industrial development, primarily associated with water transportation. There are no statewide land use plans.

b. Coastal Zone Management (CZM). Act 361, the state and local Coastal Resources Management Act of 1978, provides the basis of a comprehensive coastal planning program for the State of Louisiana. During the spring of 1979, the state prepared guidelines to serve as criteria for granting, conditioning, denying, revoking, or modifying coastal use permits. Public hearings during April 1979 allowed the general public to comment on these guidelines. A draft EIS was prepared and public hearings were held in the fall of 1979. Federal approval was granted in September 1980. New Orleans District has prepared a consistency determination which will be reviewed by the state CZM Board for consistency with state guidelines.

3.02 CONFLICTS OF PROPOSED ACTIONS WITH EXISTING OR PROPOSED LAND USE PLANS

There are no conflicts between the proposed actions and any existing or proposed land use plans on a local, state, or Federal level. All land disposal areas were obtained from local interests by means of easements. When Mermentau Basin water levels are maintained above 1.8 feet m.l.g., during summer months, US Fish and Wildlife Service (USFWS) has shown that production of waterfowl food plant on unimproved portions of the Lacassine National Wildlife Refuge is poor. Thus, the US Army Corps of Engineers project has an adverse impact nearly every year on this refuge.

SECTION 4--PROBABLE IMPACTS OF THE PROPOSED ACTIONS ON THE ENVIRONMENT

4.01 NATURE OF IMPACTS - GENERAL DESCRIPTION OF THE ACTIONS

a. Maintenance dredging. The general actions consist of dredging some existing channels to maintain their authorized depths and snagging and clearing operations in other channels to assure their continued availability. Material removed during clearing and snagging operations is tied together with cables and placed on previously cleared land on the bank. Dredged materials will be placed in areas previously dedicated as permanent dredged material disposal areas. Some of these areas have been previously utilized for disposal and others have not. Maintenance of the channels will promote continued use by commercial and private vessels and associated industrial operations; some increased traffic and industrial development may also be expected. Impacts of disposal of dredged materials into waters of the United States are discussed in the attached 404 (b)(1) Evaluation.

b. Saltwater barrier operation. The general action involves operation of the barrier structure(s) during the rice irrigation season to prevent saltwater intrusion into the upper river and Grand and White Lakes. The purpose of this project is to insure a freshwater source for irrigation and agricultural interests above the Catfish Point and Schooner Bayou Control Structures. The impact will be beneficial to the farm communities in the immediate area of the project above the barriers, whereas, it will decrease the role of Grand and White Lakes in terms of estuarine productivity.

4.02 BENEFICIAL AND ADVERSE IMPACTS

a. Beneficial impacts. Most of these projects were originally authorized long before development of benefit/cost analyses as they exist today; consequently, the following discussion regarding their effects has the limitation of being largely qualitative.

(1) Mermentau River-Gulf of Mexico Navigation Channel (bar channel).

(a) Navigation. Beneficial effects of the project involve reduction of transportation costs, primarily of outbound crude petroleum and associated products, supplies, and equipment.

(b) Employment and income. Construction of the project created jobs and generated income by facilitating water transport of petroleum related products, commercial fish and agricultural production. Periodic maintenance of the channel will provide the basis for continuing these benefits as well as providing short-term jobs associated with the maintenance work.

(2) Mermentau River, Louisiana. This project has incorporated several lesser projects with varying purposes including flood control, improvements to navigation, prevention of saltwater intrusion, and regulation of water levels in Grand and White Lakes (used as freshwater reservoirs in the cultivation of rice).

(a) Navigation. Navigation benefits of the project involve primarily transport of outbound crude petroleum and some inbound marine shell for use by construction industries. Other users of the water are crewboats, supply boats, and utility boats serving the petroleum industry as well as commercial fishing boats.

(b) Flood control. Beneficial effects of flood control features of the project involve protection of thousands of acres of cropland (mostly rice) and pasturelands situated in the lower portion of the basin.

(c) Irrigation and saltwater intrusion. The project's control structures assist in maintaining the level of fresh water in Grand and White Lakes which act as reservoirs in the cultivation of rice. The structures also help prevent saltwater intrusion which would otherwise result from tidal action, normal southerly winds, and hurricanes.

(d) Employment. Whereas this project is essentially complete and no additional employment benefits from construction are currently anticipated, it will afford the opportunity for employment by those required in the maintenance, as well as by those utilizing the waterways and irrigation waters for rice culture.

(e) Harbor of refuge. The Mermentau's outlet to the gulf provides a harbor of refuge during periods of tropical disturbances.

(3) Bayou Queue de Tortue. Although waterborne commerce on the project's 14-mile channel has been insignificant since 1937, its depth has been maintained for the flood control protection of adjacent property, primarily rice farms. Clearing and snagging operations have helped keep the bayou open for recreatonal boating. Since the area is largely rural, boating, hunting, and fishing provide a major part of its recreational opportunities.

(4) Bayou Plaquemine Brule'. Like Queue de Tortue, this 19-mile tributary of the Mermentau also provides flood control benefits as well as a waterway for recreational fishing, hunting, and boating. Unlike Bayou Queue de Tortue, however, Plaquemine Brule' is used to transport commercial freight, primarily outbound shipments of crude petroleum.

b. Adverse impacts of maintenance.

(1) Land resources. The impacts of land resources will be those acres lost as a result of wave erosion due to vessel traffic.

(2) Vegetative resources. Maintenance dredging will temporarily increase water turbidity, decreasing light penetration necessary for photosynthesis, thereby temporarily reducing primary productivity. Any submerged vegetation on channel bottoms will be removed or permanently displaced. Marsh vegetation on most of the 4,300 acres of disposal areas will be covered and destroyed during maintenance dredging. Land elevation, after initial settling, will usually be above the adjacent marsh. Revegetation will start during the first growing season after disposal. Complete coverage may take up to 5 years, and some areas may not revegetate rapidly because of heavy metals in the dredged material. Until salt is eliminated by leaching (in the southernmost sites), significant development of vegetation may not occur. On the higher areas, the initial colonizers will be shrubs and trees such as eastern baccharis, marsh elder, black willow and Chinese tallow tree. Productivity of this acreage will be less than that of the former marsh. However, gradual subsidence may occur and as these elevated areas sink, marsh species will invade. Much of the acres of marsh from Grand Lake to Vermilion Bay and along the North Prong of Schooner Bayou will probably revert to marsh during the 25-year period between maintenance dredgings. Diked disposal areas and upland areas will produce little, if any, detrital input into the aquatic ecosystem. Changes in adjacent communities may result from altered tidal and surface water flows, erosion of disposal areas, dike failure and seepage, or release of toxic substances and nutrients from disposal areas. Interagency plan-in-hand inspection of proposed disposal sites will be held prior to any maintenance dredging in order to better select least damaging disposal sites.

(3) Wildlife resources. Maintenance dredging, with subsequent disposal of dredged material, will cause temporary displacment and, in some places, elimination of wildlife, including birds, mammals, reptiles, and amphibians. Nesting and feeding areas will be destroyed. Mammals unable to escape the dredged material will be killed; marsh and swamp species will be replaced by species associated with drier habitats. Movement of wildlife due to disposal may produce increased intraspecific and interspecific competition in adjoining habitats. Migratory waterfowl, avoiding newly-used disposal areas, will feed in areas further from the river and adjacent marshes, again introducing increased competition in adjoining habitats. Plant communities replacing natural plant habitat on disposal sites will generally be of less value to wildlife since they will only furnish nesting and cover but have little food value; local populations will be reduced accordingly. Above Interstate Highway 10, clearing and snagging will interfere with wildlife resources only on a minor scale; noise may increase temporarily and some arboreal habitat will be lost. Adverse effects on population structure will occur if dredging operations coincided with the spring youngbearing season.

(4) Water resources.

(a) General. Some water resources will be lost due to disposal of dredged material in marsh ponds. In addition, development of diked confining facilities creates a potential for adverse impacts by blocking any channels that have developed in the marsh. There will be changes in runoff and drainage patterns as well as possible changes in circulation patterns in receiving waters; all efforts will be made to minimize any such changes.

(b) Water quality. Adverse water quality impacts due to clearing and snagging are minimal and are generally confined to localized short-term increases in turbidity. Adverse impacts of maintenance operations associated with dredged waterways generally include the following: (1) the impact of maintenance dredging operations on water quality at the dredging site; (2) the impact on water quality at the dredging material disposal site; (3) pollution by waterborne traffic and associated facilities; (4) pollution by industry that will locate near the waterway to take advantage of waterborne transportation facilities; and (5) saltwater intrusion problems associated with the lowering of freshwater levels in the most southern portion of the project aggravated by the continued maintenance of canals within the coastal zone. The impacts associated with dredging and dredged material disposal must be addressed by analyzing the sediments and water quality. There will be an inevitable short-term water quality degradation during dredging and dredged material disposal resulting from: (1) an increase in turbidity of the water; (2) the depression of dissolved oxygen levels; (3) the release of toxic heavy metals or arsenic; and (4) a significant release of aquatic nutrients. At the site of dredging activity there will be an inevitable short-term localized increase in turbidity due to the rotary motion of the cutterhead. An extensive water quality and dredging monitoring program has been accomplished by the New Orleans District of the Corps of Engineers throughout southern Louisiana over a several-year period. Results of this program have determined that increases in toxicants are generally of a short-term nature and conditions return to ambient within several hours of cessation of dredging activities.

(1) Elutriates. Metals which were present in standard elutriate mixtures in excess of EPA limits were mercury, copper, cadmium, nickel, and lead. Data for elutriate heavy metals are summarized in Table 4. Elutriate cadmium exceeded the EPA criterion at 7 out of 21 sites. It is noted that ambient water (see Table 2) cadmium at the 7 sites and 2 others also exceeded EPA criteria. Elutriate copper levels exceeded EPA criteria at half the sites in segments III, IV, and VI. In most cases, the ambient water also exceeded the criterion. Elutriate nickel and lead levels in segments VII and VIII exceeded EPA criteria; ambient water levels also

exceeded the criteria. Elutriate mercury exceeded the criterion in segments IV and VII only; ambient concentrations also exceeded the criteria. The elutriate data in Table 4 are related to the native water data in Table 2 because the standard elutriate mixture is composed of 80% surface water. However, the data in Table 2 represent total constituent concentrations in the water column, as opposed to dissolved levels in the water column. The dissolved levels in the water column are shown in the water quality appendix, Tables A-5 through A-40. The standard elutriate mixture constituent values in Table 4 are concentrations associated with the dissolved fraction. In segments III and IV, both lead and cadmium are lower in the standard elutriate than in the ambient water; however, there is a slight rise in the dissolved fraction in most cases. The four sample sites show increases in mercury in the elutriate versus mercury associated with the dissolved fraction in the ambient water. In segment VI, copper levels in the standard elutriate were greater than the ambient water total values for three samples and less for three samples; comparison of elutriate with dissolved values indicates dissolved copper values were increased at all sites. For zinc, all standard elutriate levels showed slight increases over the ambient water dissolved fraction in this segment. Mercury in segment VI was less in the standard elutriate than in the total ambient water values for all six sample sites. Elutriate mercury levels were greater than dissolved fraction mercury levels for three out of six samples, and less for three out of six samples; this would suggest that, as well as being released into the water column, mercury may also be adsorbed by fine materials in the water column as a result of dredging. In segment VII, copper in the standard elutriate is increased for two samples over dissolved ambient levels, decreased for two samples from dissolved ambient levels, and unchanged for 4 samples. Zinc levels in segment VII standard elutriates were increased for seven out of eight samples when compared to ambient water dissolved fraction; however, all standard elutriate values were within the water quality criteria as shown on Table 4. Segment VII mercury levels were only detected in two out of eight standard elutriate and ambient water sites down to the 0.1 ug/l detection level; mercury was greater in the elutriate than in the dissolved ambient water for both sample sites. Analysis of the comprised data indicates that constituent levels in the standard elutriate were both higher and lower than in ambient waters, more often being higher. The magnitude of constituent release as measured by this comparison was in many cases relatively low. The data points to the many complex factors which may influence release of metal constituents. Calculation of mixing zones is precluded where ambient waters exceed the EPA criteria. Generally, heavy metals in elutriates were not present in great absolute amounts and they were accompanied by relatively high surface water levels. While the elutriate data indicate potential releases of mercury, copper, zinc, and lead at specific locations, it must be remembered that behavior of these heavy metals is dependent on many factors, including grain size, organic content, pH, Eh, iron, manganese and sulfide contents, and salinity. Resuspension of sediments may convert loosely adsorbed or particulate forms of heavy metals to dissolved forms. This would increase gross amounts of contamination. While it is very difficult to predict the

remembered that, on the whole, heavy metal levels in the elutriates (and in the bottom sediments) are not greatly above the EPA limits. This does not preclude the possibility that increased gross contamination of heavy metals could be transported under certain hydrographic conditions to locations removed from the project site, where potentially significant deterioration could result.

(2) Sediments. Analysis indicates the presence of heavy metals and arsenic in dredged sediments at levels above the proposed guidelines (see Table 3): zinc in segments III, VII, and VIII; mercury in segments IV and VI; and arsenic in segment VIII. Neither zinc nor mercury was present in absolute levels greatly above the proposed guidelines. Arsenic was found to exceed the EPA proposed sediment guideline at all sample sites in segment VIII. This does not indicate arsenic would be released in substantial quantities into the aquatic environment. No EPA ambient water quality criterion currently exists for arsenic. Although arsenic concentrates in aquatic organisms, it evidently is not progressively concentrated along a food chain (Quality Criteria for Water, USEPA, 1976). In addition, arsenic consumed as an organically bound species appears to have a low toxicity. Segments III, IV, VI, and VII exhibited COD, TKN, or TVS levels exceeding the EPA proposed guidelines. High values of TKN and COD are indicative of marsh type soils and water. Releases of both can be expected due to dredging. TKN values can be attributed to the high organic content of the sediments. Only a small percent of the release will be due to releases of ammonia. It is likely that any release of nutrients will be rapidly assimilated into the marsh system. The release of COD is not expected to cause any water quality problems in the long-term, though dissolved oxygen levels could be depressed during dredging operations in areas where little mixing would occur. The elutriate values for all pesticides of all segments indicate no releases from the sediment to the water column. Bioassays were carried out using water and sediments from the Gulf Approach Channel (see Appendix C) on a variety of sensitive marine vertebrates and invertebrates in a winter and summer series for liquid, suspended particulate, and solid phase. The results of these bioassays indicated that in no case was the difference in mean survival between animals in the reference and test sediments statistically significant. This was true for liquid, suspended particulate and solid phase bioassays in both winter and summer series. The results of these bioassays show that disposal of sediments of the Mermentau River Bar Channel would not be expected to cause acute mortality to aquatic organisms. The potential for bioaccumulation of pesticides, polychlorinated biphenyls (PCBs), heavy metals, or petroleum hydrocarbons in the tissues of marine organisms was evaluated by laboratory methodologies for the winter (12°C) and summer (25°C) series. The laboratory assessment for bioaccumulation was conducted using organisms exposed to the maintenance dredged material in the solid phase bioassay. The organisms included clams (Mercenaria mercenaria) and sandworms (Nereis virens) in the winter series, and clams and American oysters (Crassostrea virginica) in the summer series. Results of both winter and

series indicated that the concentrations of most constituents did not show a statistically significant difference between animals exposed to test and reference materials. Results of the winter series indicated a statistically significant increase of mercury in the tissues of sandworms and clams exposed to test material versus those exposed to reference sediment, at each of the three sample sites. Results of the summer series indicated a statistically significant increase of heptachlor in tissues of oysters exposed to test material versus those exposed to reference material, at one sample site only. The maximum mean wet weight concentrations of mercury in sandworms and clams exposed to test sediments under the winter condition were 0.350 mg/kg and 0.124 mg/kg, respectively. The maximum mean tissue concentration of mercury in the clams exposed to test sediments was appreciably less than body burdens of mercury in clams exposed to reference sediments from other areas along the gulf coast. Tissue concentrations of mercury in clams exposed to reference sediments were 1.022 mg/kg from the Sabine-Neches Waterways, 0.56 mg/kg in the Texas City Navigation Canal, and 4.05 mg/kg in the Galveston Channel. It can be seen that exposure of clams to these reference sediments resulted in mercury body burdens which were 4.5 to 32 times the mercury body burdens in clams exposed to sediments from the Mermentau River Bar Channel. This would suggest that, while there may be a statistical significance to the variations in mercury body burdens in clams exposed to test and reference sediments from the Mermentau River Bar Channel, and that while this statistical significance may indicate incremental accumulation would occur as a result of the maintenance dredging operations, the incremental accumulation is comparatively insignificant in relation to the magnitudes of mercury accumulation attributed to reference sediments in these other gulf coast areas. The maximum mean mercury concentration of 0.350 mg/kg in sandworm tissues exposed to test sediments was less than the 0.42 mg/kg found in sandworms exposed to reference sediments from the Sabin-Neches Waterway, located west of the Mermentau River Bar Channel. This would again suggest that levels of accumulation resulting from exposure to the test sediments from the Mermentau River Bar Channel are within the magnitudes of accumulation found in reference sediments in the gulf coast area. Accumulation of mercury may be influenced by a host of environmental factors, which include the source and quantity of a constituent, its location in the abiotic compartments of the environment, its forms and bioavailability, the feeding habits of native organisms, temperature, and other physical and chemical parameters, and kinetic rates of uptake and depurdation. The US Food and Drug Administration (FDA) guidelines specify a maximum level of 1.0 ppm (1.0 mg/kg) mercury in fish and shellfish which are to be used for human consumption. Therefore, the maximum mean mercury concentrations in sandworms and clams exposed to test sediments were within the FDA limits. Laboratory studies conducted by Waterways Experiment Stations have indicated that accumulation of mercury in aquatic organisms resulting from disposal of material from this type of maintenance dredging project occurs predominantly within the initial time period of 24 to 48 hours, after which a plateau is reached

and the rate of accumulation is negligible (personal communication, Engler, 1980). Mercury concentrations in organisms exposed to test materials over longer exposure time would not then be expected to reach levels which exceed FDA guidelines. Data from field bioaccumulation studies in Delaware using American oysters taken from uncontaminated control sites showed tissue concentrations of mercury ranging from 0.283 mg/kg to 0.645 mg/kg, the average value being 0.407 mg/kg. These tissue concentrations are above those of either sandworms or clams exposed to the test sediments. It would therefore not appear that any of the organisms exposed to test sediments from the Mermentau River Bar Channel have or would accumulate mercury to levels which are unreasonable or above levels found in "clean" coastal areas. Mean concentrations of heptachlor in tissues of American oysters during the summer series were 2.0 ug/kg, 2.0 ug/kg, 3.4 ug/kg and 1.3 ug/kg for the reference sediment and stations 1, 2, and 3 respectively. It should be noted that one test station showed less heptachlor in oyster tissues than the reference sediment, and one test station showed an equal mean heptachlor concentration. Station 2 showed the highest mean heptachlor concentration in oyster tissue of 3.4 ug/kg wet weight. Of five replicates performed for reference sediment, two showed values of 3 ug/kg. The data show that a small incremental accumulation at one test station on the order of 1.4 ug/kg may have occurred. The maximum body burdens of heptachlor in oysters at Station 2 were 4 ug/kg, which is 1.3% of the FDA limit of 0.3 mg/kg heptachlor in fish and shellfish designated for human consumption. Studies conducted by WES have indicated that accumulation of chlorinated hydrocarbon pesticides in aquatic organisms resulting from disposal of material from this type of dredging project occurs predominantly within the first 30 days, after which a plateau is reached and accumulation is negligible (personal communication, Engler, 1980). Therefore, heptachlor would not be expected to accumulate in oysters to levels which would be more than a small fraction of FDA guidelines. Therefore, while the laboratory studies indicated bioaccumulation of two constituents which was statistically significant, in the scientific sense, the actual levels of the constituents in aquatic organisms were not high. In no case did the laboratory analyses indicate that disposal of maintenance dredged material into areas which have historically been used for such purposes would result in substantive incremental accumulation of mercury or heptachlor in aquatic organisms.

(c) Summary. A perusal of elutriate, ambient water and bottom sediment data leads to the following conclusions:

1. Segments III and IV - Maintenance activities for Bayous Plaquemine Brule' and Queue de Tortue consist of clearing and snagging activities only, with no dredging involved. Sediment analyses show the presence of heavy metals and oxygen demanding substances. Elutriate testing shows potential releases of these substances in a hydraulic dredging situation. However, the standard elutriate mixture is a "worst case" approximation and is certainly not indicative of releases which would occur during clearing and snagging. When one considers the short-term nature of releases that occur during dredging situations, the rapid

restoration to background conditions, and the established presence of heavy metals in the native water, it would appear that water quality degradation from the type of maintenance operation to be performed in these bayous would be minimal and short-term. The major impact would appear to be minor localized increases in turbidity incidental to snagging operations.

2. Segment VI - Hydraulic dredging activities would be accomplished in this segment only twice in the next 50 years. Elutriate and sediment data show potential releases of copper, mercury, zinc, and oxygen demanding substances. Elutriate mercury, zinc, and copper for the most part are close to ambient water levels. Some oxygen depressions may result in low mixing areas. Where diked disposal areas are used, they would reduce potential releases of metals and oxygen demanding substances into ambient waters. Impacts inferred from sediment and elutriate analyses would be less than test data because of the conservative nature of the test and because comparison is made to chronic criteria. Significant metal releases in this segment probably would not occur. Increases in turbidity at the cutterhead would be inevitable, but would be relatively minor and of a short duration.

3. Segment VII - This segment would be dredged hydraulically once every seven years. Sediment data show this segment to be relatively free of heavy metal constituents. Elutriate data indicate lead and mercury slightly above native waters and EPA chronic exposure criteria, respectively. It is concluded that little degradation would occur from heavy metals as a result of maintenance operations. Where retention dikes are used, they would reduce any potential impact on ambient water quality. Ambient water quality would not be significantly affected by maintenance operations. The principal impact would be localized short-term increases in turbidity originating at the cutterhead.

4. Segment VIII - This segment would be hydraulically dredged and material placed in open-water disposal sites adjacent to the channel. One criteria-exceeding elutriate zinc concentration was less than ambient levels. Arsenic was present in relatively low levels in the elutriates. It is concluded that no significant metal releases would occur from disposal. TKN values show potential oxygen demanding substances. These could cause DO depressions, but it would be anticipated that natural water movements in the gulf and dispersion would cause a rapid recovery. The main effect on water quality would consist of turbidity introduced into ambient waters at both the cutterhead and in the disposal area.

(d) Groundwater. Groundwater would be affected by increased industrial growth in the areas which may occur as a result of maintenance of deepwater navigation channels in the Mermentau River. Groundwater withdrawals could increase as process and cooling water requirements of industry increase. Local population increases, attracted by increased industrial growth, would then also require more water. Water-level decline, saltwater encroachment, and increased land subsidence may result from large-scale groundwater pumpage. The slight possibility of groundwater contamination by metals, particularly mercury, at the disposal sites

may exist. It has been demonstrated that if oxidizing conditions develop at upland disposal sites, and if sulfides are abundant in the dredged material, then mercury can be mobilized and made available to groundwater and for plant uptake. The significance of the potential for this problem is unknown at this time.

(5) Aquatic resources

(a) Effect of disposal in marshes. Deposition of dredged material on the marshlands would decrease diversity of aquatic organisms, especially where waterways and marshes communicate. Diversity will be less at the water/high ground ecotone than at the more extensive marsh/water interface. This loss of 4,300 acres of marsh and its associated detrital output will cause a decrease in commercial and sport fisheries.

(b) Effects of pollutants. Levels of mercury and cadmium in the background native water and elutriate, exceed EPA criteria at several locations in this project. The ecological impact of this chronic low level pollution is difficult to assess. Mercury can be directly toxic but can also alter behavior, reproduction, feeding, etc. Predation on contaminated organisms results in transfer of mercury to higher trophic levels. In terms of this project, with background levels of mercury slightly exceeding EPA criteria, it would not appear that maintenance dredging would cause substantive increases in mercury concentrations at any location. Resuspension of mercury contaminated sediments could cause a conversion of particulate mercury in the sediments to the dissolved form, thus increasing the gross quantities of mercury in the surface waters of the project area. This could increase the amount of mercury ultimately available for uptake by aquatic organisms.

(c) Effects of increased channel size. Maintenance of the lower Mermentau River between the gulf and the Catfish Point Control Structure would permit easier access by some adult marine species to the marshes. However, early life stages of most marine/estuarine species depend on the incoming tide for ingress into estuarine areas and do not require a maintained channel for entry. Additionally, increased water velocities in the maintained channel will flush many early life stage organisms out of the estuary during times of flood water releases. The loss for juvenile estuarine organisms of shoreline marshes to deposition of dredged material is an added effect of increasing channel size. During floods and high water, any increased water velocities resulting from increased channel size and lack of obstructions may cause a small increase in bank erosion, siltation, and turbidity. Effects of channelization will be small compared to other factors.

(d) Effects of clearing and snagging. Above Interstate Highway 10, clearing and snagging will adversely affect fishery habitat by removing cover and spawning areas. Additionally, the removal of substrata which supports fish food organisms will cause long-term reduction in overall productivity. Clearing and/or removing overhanging vegetation will change the nature of the riparian lands and will change the characteristics of the streams by increased water temperatures due to decreased insolation. Increasing the rate of water flow by snagging and dredging may adversely

affect the reproduction of striped bass stocked in the Mermentau River. The eggs and newly hatched fry may be flushed out of the estuary by the increased water velocities.

(e) Effect of bar channel dredging. The major effect of dredging itself is the physical destruction of benthic organisms and their habitat. Most benthic invertebrates are killed by passage through the dredge (Oliver and Slattery, 1976). The navigation channel extends approximately 1.25 miles into the gulf. The maintenance of a 1.25 mile long by 200-foot wide channel will disrupt nearly 30 acres of water bottoms.

(f) Effect of disposal of dredged material from bar channel. Burial of benthic organisms in the 123-acre disposal area is the major effect of disposal. The blanket of sediment over this area will probably vary from 40 cm. thick near the channel to 5 cm. thick at the far edge. Fast moving, epibenthic organisms such as shrimp and crabs will be able to escape burial. When covered with 30-40 cm. of material, some large mollusks and polychaetes can burrow upward and escape while others are destroyed (Slotta and Williamson, 1974 and Oliver and Slattery, 1976). Oysters are killed only when totally buried by dredged material (Ingle, 1932 and Lunz, 1952). Most sessile or slow moving organisms such as sand dollars, anemones, and sea pansies will be killed by the settling of more than 10 cm. of material. Disposal of dredged material can affect marine eggs and larvae (Cordone and Kelly, 1961).

(g) Effect of differences in grain size distribution. Benthic habitat can be drastically altered by deposition of dredged material that is of a different grain size than the natural substrate. As described in paragraph 2.02, grain size 6,000 feet from shore is essentially the same in the channel and disposal area. At 4,000 feet grain size is similar, but at 2,000 feet the channel is 75 percent sand and 14 percent clay, while the disposal area is 40 percent sand and 38 percent clay. Disposal of the sand on the clay substrate could cause subsequent changes in species composition as the area repopulates.

(h) Recolonization.

(1) Time required. Several studies have shown that recolonization of disposal areas to predredging levels of individual and species diversity is fairly rapid. The following results have been obtained: 1 to 2 weeks - McCauley, Hancock, and Parr, 1976; 6 weeks - Water and Air Research, Inc., 1975; 2 months - Harper and Hopkins, 1976; 6 months - Leathen, Kinner, Maurer, Biggs, and Treasure, 1973, and Stickney and Perlmutter, 1974; 12 to 18 months - Pfitzenmeyer, 1969. During dredging and immediately after, the number of individuals falls drastically. Some studies indicate a prompt return to predredging levels (Harper and Hopkins, 1976), while other studies indicate a long-term reduction in the number of individuals (Oliver and Slattery, 1976). Results of studies on species diversity are similarly contradictory. Many authors (Oliver and Slattery, 1976 and Stickney and Perlmutter, 1974) found a higher species

diversity after dredging and disposal, while other results indicated that species diversity did not return to predredging levels for a year and a half (US Department of the Interior, 1970 and Cronin, 1970).

(2) Colonizing organisms. Opportunistic organisms are first to appear in the disturbed water bottoms. Such organisms usually mature quickly. Larval recruitment is rapid in recently altered areas devoid of competitors and rich in organic debris. Recolonization also occurs by active migration of adult organisms and slumping of adjacent banks (Stickney and Perlmutter, 1974 and McCauley et. al., 1976).

(i) Effect of repetitive dredging. The total effect of disposal depends on the frequency with which it occurs. Because the gulf section of Mermentau River Bar Channel is dredged every 2 years, it is occupied by an opportunistic assemblage of organisms much of the time. Since recovery takes an average of 6 months, the number of individuals is reduced approximately 25 percent of the time, which permanently reduces benthic productivity. Time of dredging can influence the severity of the impact. If dredging is undertaken in the summer when the number of benthic organisms is at a seasonal low and when active spawning is not occurring, then when the autumn population expansion occurs, larvae will settle in the disturbed area.

(j) Effects of turbidity caused by dredging and disposal. The major effect of turbidity is the temporary lowering of primary productivity caused by reduction in light penetration which causes a decrease in photosynthesis. Free-swimming organisms can avoid the plume of turbidity (Stickney, 1972). Turbidity can have the following effects: (1) it abrades the gills of fish and clogs the feeding apparatus of zooplankton (Cordone and Kelly, 1961); (2) destroys oyster larvae (Cardwell, Woelke, Carr, and Sanborn,1976); (3) reduces the pumping rate in mollusks (Loosenoff, 1961); and (4) adversely affects crab molting (Petticord and McFarland, 1976). Effect of turbidity on zooplankton populations is uncert in, but probably minor (Sullivan and Hancock, 1977).

(k) Effect of dredging and disposal on fisheries. Channel maintenance and deposition of dredged material over 123 acres will have a minor deleterious effect on fishing by lowering benthic productivity on these acres and by adversely affecting fish and shellfish growth and reproduction. Due to a lack of baseline data, it is impossible to quantify this effect. Shallow littoral bottoms inside the 3-mile limit are more productive than their mere aereal extent indicates. Approximately 94 percent of the menhaden, 97 percent of the spotted seatrout, and 32 percent of the shrimp are caught inside the 3-mile limit (US Department of Commerce, 1976). Therefore, disposal of dredged material with its attendant turbidity in these shallow bottoms will have an effect greater than indicated by the proportionality of square miles. Turbidity engendered by dredging will discourage participation in sport fishing on a localized basis on days when the turbidity is high.

(6) Vector problems. Disposal of dredged material can increase mosquito breeding habitat resulting from cracked surfaces formed on partially dewatered areas. Trapped water provides habitat for permanent water species. Large population of several mosquito species are currently present in the region, and creation of additional habitat will benefit their production. Considerable vector potential presently exists in the project area; increased mosquito densities could intensify the rate of disease transmission if local disease outbreaks should occur.

(7) Air impacts. An adverse impact on air quality will occur from ragweed, a temporary colonizer of dredged material sites. Pollen from these plants is wind-borne, and is known to cause hayfever in humans. Other impacts will be emissions from dredging equipment in operation and from added recreational and commercial vessel usage after improvement. Disposal of dredged material on land will result in the temporary release of objectionable odors by the decomposed vegetation and organic material from the channel bottom.

(8) Economic and social impacts.

(a) Mermentau River - Gulf of Mexico Navigation Channel (bar channel). The only significant socioeconomic impact of the project is the monetary cost of maintaining it. Little, if any, adverse impacts to the commercially harvested saltwater fisheries are expected.

(b) Mermentau River, Louisiana. Adverse socioeconomic impacts of this project include its maintenance costs, some bank erosion, and substantial impacts on commercial fishing industries due to the saltwater control structures. Erosion-caused socioeconomic impacts are minor, since only part of the land adjacent to the river is naturally high enough to support agriculture or other uses. Adverse impacts to the commercial fishery resources are more serious. Approximately 1,000,000 pounds of white shrimp and 200,000 pounds of blue crabs could be foregone annually as a result of the project if the Catfish Point and Schooner Bayou Control Structures are not operated as decided upon in 1976 and 1979 respectively, and as described on page I-7.[1]

(c) Bayou Queue de Tortue. This project was constructed many years ago and has long since been incorporated into the area's social and economic environment. Its primary adverse impact from a socioeconomic standpoint has been the cost of its maintenance.

(d) Bayou Plaquemine Brule'. Like Queue de Tortue, this small stream has been maintained by the Corps since shortly after the turn of the century. Its adverse socioeconomic impacts have been primarily limited to the cost of its maintenance.

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[1]US Fish and Wildlife Service (USFWS) letter dated April, 1975.

(9) Recreational resources. Operation of the control structures will cause decreased saltwater sport fishing opportunities in Grand and White Lakes. Loss of marsh will also decrease sport fishing opportunities in the general area. Other adverse impacts on recreational resources will be chiefly short-term limitations on boating and fishing in the vicinity of the dredging. Secondary impacts will involve a decrease in local fishing, shrimping, and crabbing as industrialization and increased use of the waterways occur.

(10) Cultural resources. No cultural resources listed on or eligible for inclusion in the National Register of Historic Places are located in the project areas of the Bayou Plaquemine Brule', Bayou Queue de Tortue, and the Mermentau River - Gulf of Mexico Navigation Channel projects. Subsequently, an intensive cultural resources survey of the Mermentau River from Grand Lake to the Gulf of Mexico was conducted in 1980 by Texas A&M University. The draft report and recommendation is currently in preparation. Prior to the next maintenance activities on any or all of the four remaining segments of the Mermentau River project, an intensive on-the-ground cultural resources survey will be performed on the project areas. Any cutural resource listed on the National Register of Historic Places or found eligible for inclusion in the Register, and to be adversely impacted by the Mermentau River project would be either avoided, protected, or in the absence of a feasible alternative, excavated.

(11) Agricultural resources. The action will not involve any agricultural lands. Dredged material is to be deposited on areas which have already been utilized as disposal sites, and in open waters.

(12) Mineral resources. The action will not have any adverse impacts on mineral exploration or production activity in the area.

(13) Esthetic values. Esthetics involve subjective judgments. Some people feel that waterborne commerce causes an offensive incongruity to the natural environment, while others find boats and barges passing on the river very interesting. From the standpoint of an alteration in the natural surroundings, the esthetics are somewhat adversely affected and may deteriorate as traffic and associated industry increases. Degradation of esthetics may also be severe where dredged material deposits are located near campsites along the middle and upper Mermentau River.

(14) Socioeconomic resources. To the extent that the projects in the basin have a net adverse impact on commercial fisheries, employment in this endeavor may be somewhat restricted.

(15) Impacts on endangered or threatened species. The project will deposit dredged material on some habitat that could be utilized by the American alligator. However, it is highly unlikely that any alligators will be killed during project operations. No endangered species will be adversely affected by these projects.

c. Adverse impacts of water control structure operation. Operation of water control structures at Catfish Point and Schooner Bayou, and at locks at Vermilion Bay and Calcasieu Rivers, has a two-fold environmentally adverse effect. First, the normal flow of saltwater into the estuary is blocked, and second, freshwater is being impounded. This renders the water from the Mermentau estuary suitable for rice irrigation but has detrimental effects on estuarine organisms. As a result of the operation of the water control structures, the normal migration patterns of such estuarine-dependent species as white, and to a lesser extent, brown shrimp, blue crabs, menhaden, and croakers have been disrupted. The ingress of larval forms of these organisms into the Mermentau estuary is being blocked to a significant extent, resulting in fewer numbers of these species being able to utilize this estuary as a nursery area. Periodic opening of the Catfish Point and Schooner Bayou water control structures during times of peak immigration of juvenile estuarine-dependent organisms tends to offset to a certain extent the overall adverse effects of operating the structures. Loss of detrital output from Grand and White Lakes to the Lower Mermentau River and the Gulf of Mexico occurs because of operation of the control structures. Continued operation of the control structures prevents return of the original intermediate marshes in the vicinity of these two lakes. Operation of the structures maintains an artifically high water level in the lakes, and annual grasses and sedges cannot grow along the shoreline. The absence of these waterfowl foods decreases the value of the area in terms of attracting ducks and geese. Operation of the structures by maintaining high water levels also reduces the numbers of nutria and muskrat that can utilize the area because of the decreased food supplies and loss of available habitat. Maintenance of high water levels reduces the number of wading birds in the area because the number of small pools and ponds that trap fish and invertebrates is drastically reduced. The high water levels maintained by this project appear to have increased the amount of shoreline erosion in the lakes as evidenced by previous maps and charts of the area. High water levels originally "drowned" marsh, and maintenance of these levels prevents the growth of marsh plants on what is now water bottoms.

4.03 REMEDIAL, PROTECTIVE, AND MITIGATION MEASURES

a. Pollution abatement.

(1) Dredged material. The method of maintenance dredging will be in accordance with paragraph 6.01 a-e and each project or segment thereof will be evaluated in accordance with economic, engineering and environmental considerations. Disposal of dredged material from the maintenance projects will be in accordance with Federal, state, and local laws governing prevention of environmental pollution. Land disposal areas previously used for dredged material placement will be reused.

(2) Water. Turbidity, a factor inevitably associated with dredging, will be reduced through land disposal of dredged material in diked areas in most segments of the project. When sediments are disturbed, some pollutants will be resuspended. Management and conservation especially in present and future industrial zones will be necessary to protect underground and impounded water resources.

(3) Vectors. Control of temporary-water mosquitoes by impoundment of appropriate water depths is planned. Access to impoundments for predators and parasites of permanent-water mosquitos would be important for reducing populations of these species.

b. Fish and wildlife. Dredging and disposal operations will be coordinated with the Louisiana Department of Wildlife and Fisheries (LDWF), US Fish and Wildlife Service, and National Marine Fishery Service requirements and regulations. Interagency teams will conduct inspections of proposed disposal sites to assess overall environmental impacts prior to completion of plans and specifications for maintenance dredging. The US Army Corps of Engineers, New Orleans District, will coordinate maintenance dredging plans with the State Planning Office to comply with the Coastal Zone Management program. Opening of Catfish Point and Schooner Control Structures will be coordinated with LDWF to allow ingress of juvenile shrimp.

SECTION 5--PROBABLE ADVERSE ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED

5.01 LAND RESOURCES

Wave erosion due to increased commercial and recreational waterway use will result in a loss of land resources.

5.02 VEGETATIVE RESOURCES

Existing vegetation will be destroyed on 4,300 acres of marsh. Recolonization with "upland" species will take up to 5 years and as long as the upland plants cover the area; productivity will be less than that of the original marsh. Subsidence will allow restoration of the marsh in some areas. Temporary turbidity will lower primary productivity.

5.03 WILDLIFE RESOURCES

Wildlife occupying over 4,300 acres will be adversely affected because of the reduction of available habitat due to the actual disposal operation. Some animals will be displaced, others destroyed. Maintenance of the water control structures will keep the numbers of waterfowl and furbearers in the area artificially low.

5.04 WATER RESOURCES

Some water resources will be lost due to disposal of dredged material in marsh ponds. In addition, development of diked confining facilities creates a potential for adverse impacts by blocking any channels that have developed in the marsh. Few changes in runoff and drainage patterns or changes in circulation patterns in receiving waters are anticipated. These changes will not impact rice irrigations.

5.05 AQUATIC RESOURCES

a. Aquatic organisms and habitat. Temporary degradation of water quality near dredging activities is unavoidable. Maintenance dredging in the project area will eliminate some organisms and temporarily stress others. Aquatic life, such as shrimp, crabs, shellfish, estuarine and freshwater fishes, phytoplankton and zooplankton, and larval forms of these and other organisms, will be adversely affected by loss of marsh, lowered water quality, increased channel size, dredging in the river and bar channel, burial by disposal of dredged material, and temporary turbidity. Effects on overall productivity will be moderate. As subsidence occurs, some marsh will regain its former productivity as marsh

plants invade the former upland habitat. Continued operation of the water control structures (even with limited openings to allow ingress of shrimp, etc.) will reduce the productivity of the aquatic ecosystem.

b. Aquatic dredged material disposal. Disposal of dredged material in water bottoms in the Gulf of Mexico could result in elimination of benthic organisms from those areas. Turbidity and sedimentation can occur, stressing aquatic organisms and blanketing benthic habitat. Larger organisms; i.e., fish, crabs, etc., can escape from turbid waters and the more mobile forms can burrow upward through less than 30 cm. of dredged material. Most immobile bottom and filter-feeding organisms will be smothered, and the resulting new substrates will not necessarily be suitable for the former inhabitants for some time. Dredging and disposal operations may introduce organic material into the water column, increasing Biochemical Oxygen Demand (BOD) levels, lowering Dissolved Oxygen (DO) levels, and possibly stressing adjacent organisms. Other substances released by dredging, including H_2S, heavy metals, and petroleum residues, may also be detrimental to organisms adjacent to the dredging operation. From the results of elutriate data available for maintenance operations on this project, and as discussed in previous sections of this EIS (see sections 2.03f and 4.02b), it would not appear that unacceptable releases of heavy metals, pesticides, or oxygen demanding substances would occur in any area of the project as a result of the proposed maintenance operations. Bioassay results for the Mermentau Bar Channel indicate that water and sediments in this area pose no serious or unacceptable hazards to the marine environment. Long-term adverse effects of aquatic dredged material disposal relate to the increased gross amounts of contaminants, principally mercury on this project, which would be made available for uptake by aquatic organisms, bioconcentration, and subsequent transfer to higher trophic levels. Bioaccumulation studies on organisms exposed to test sediments from the Gulf Approach Channel (see Appendix C) have demonstrated statistically significant accumulation of the pesticide heptachlor in oysters, and of mercury in clams and sandworms. This does not imply that project implementation would result in substantively increased bioaccumulation and food chain transfer. It would appear, however, that increased gross contaminant amounts would be made available to the aquatic ecosystem.

c. Sport and commercial fisheries. These activities depend upon marsh and aquatic productivity levels, which will be diminished by the maintenance dredging operations. In addition, fishing activities may be diminished due to increased industrialization and population growth of the region. Loss of potential for 1,000,000 pounds of shrimp and 200,000 pounds of crabs occurs annually due to operation of the control structures.

5.06 ECONOMIC AND SOCIAL IMPACTS

Unavoidable adverse socioeconomic impacts of the four projects include operation and maintenance costs of the projects, bank erosion of Grand and White Lakes, and adverse impacts to commercial fisheries. The minor erosion of stream banks is expected to have little if any adverse impact on adjacent marshes or agricultural lands.

5.07 WATER QUALITY IMPACTS

Unavoidable impacts of the maintenance projects would include temporary turbidity, possible oxygen depletions resulting from oxygen demanding substances in the dredged material, and possible releases of mercury, copper, lead, cadmium, and zinc into the surface waters of the project area. These impacts have been discussed in sections 2.03e, 4.02b, and 5.05b of this EIS.

5.08 RECREATIONAL RESOURCES

Increased navigational use of project waterways by commercial craft would interfere with pleasure boating, fishing, and related recreational activities.

5.09 CULTURAL RESOURCES

The Bayou Plaquemine Brule', Bayou Queue de Tortue, and Mermentau River - Gulf of Mexico Navigation Channel projects will not have an adverse impact upon any cultural resources listed on or determined eligible for inclusion on the National Register of Historic Places. Subsequently, an intensive cultural resources survey of the Mermentau River from Grand Lake to the Gulf of Mexico was conducted in 1980 by Texas A&M University. The draft report and recommendation is currently in preparation. The remaining four segments of the Mermentau River, Louisiana, project will be covered by an intensive on-the-ground cultural resource survey prior to the next maintenance activities. Any cultural resource listed on the National Register or found eligible for inclusion in the National Register of Historic Places and to be adversely impacted by the Mermentau River, Louisiana, project will be either avoided, protected, or in the absence of a feasible alternative, mitigated by excavation.

5.10 AGRICULTURAL RESOURCES

No unavoidable primary adverse impacts will be felt by regional agricultural interests. Negative secondary effects may result if farmland is utilized for industrial, commercial, and residential expansion due to improved shipping capabilities.

5.11 MINERAL RESOURCES

Depending on the state of the economy, exploration and production of different mineral resources (particularly oil and gas) are expected to increase. Improved navigation facilities would accelerate development of these resources. Exhaustible resources may be depleted at a faster rate.

5.12 EXISTING DEVELOPMENTS

No unavoidable adverse impacts from the proposed projects will accrue to existing development.

5.13 HUMAN ELEMENT

A long-term adverse impact will be felt by the local populace if the quality of the natural environment suffers as a result of more frequent ship movements in the river and of increased development of the region. If such trends occur, they may affect the recreational and esthetic uses of the area.

SECTION 6--ALTERNATIVES TO THE PROPOSED ACTION

6.01 STRUCTURAL ALTERNATIVES

a. Unconfined hydraulic dredging. Large areas would be required; placement of dredged materials on larger areas would serve to spread the material more thinly, elevate the land to a lesser extent, and allow greater chance for revegetation by a similar floristic community. Adverse impacts will be increased turbidity in adjacent waterways and smothering of benthic organisms.

b. Confined hydraulic dredging. By this method, material is placed in specifically designated diked disposal areas. Returning water from the disposal area can be clarified through use of weirs and spillboxes. Disposal in designated diked areas causes the least increase in turbidity. High ground created will be colonized by a shrub community, providing cover and refuge for animals during floods or high tides. Loss of marsh flora and fauna, including detrital nutrients contributed by marshes and swamps, would occur as a result of increased elevations above water/tide influence.

c. Bucket dredging, casting, and stacking. The cast and stack method would require the least amount of land, reducing impact of changes in land use. Existing ridges may be used for dredged material placement, reducing marsh losses. Extant vegetation would be destroyed, but revegetation would soon begin. Establishment of a mature forest may take upwards of 50 years or more, and, if the area is reused for disposal, succession must begin again. This method is most subject to erosion and would return sediment to the waterway along with increases in turbidity. In open waters, waves and currents could move material back into the channel.

d. Complete removal of dredged material. The dredged material could be barged to the Gulf of Mexico for open water disposal, or to less sensitive project areas. This alternative would be expensive, energy-consuming, and to cause the least harm to their resources, would require a carefully chosen deposition site.

e. Open water disposal. Open water disposal involves placement of dredged material in unconfined open-water areas parallel to the actual work area, or offshore. This method (a) shortens the distance of dredged material transport; (b) increases efficiency of the dredge pump; and (c) lowers dredging costs. Adverse impacts include: (a) resuspension of pollutants into the water column; (b) sediment build-up and burial of benthic communities and habitats; (c) alteration of substrate-habitat quality, biological migration and flushing times and (d) reduction in

nutrient availability. In addition, oxygen depletion and suffocation of adjacent benthic and pelagic organisms may occur. Turbidity temporarily decreases planktonic diversity, interferes with nekton movement and migration, and results in decreased food availability for higher trophic levels.

6.02 NONSTRUCTURAL ALTERNATIVES

a. No action. Failure to maintain project channels at their authorized specifications would result in a gradual decrease in their depths and widths; failure to operate project control structures would permit saltwater encroachment into valuable agricultural lands. Bulk carriers of oil and gas products, shipbuilders, and commercial fishing interests depend upon waterways. A reduction in depth will impair maneuverability and decrease the headway of tows and fishery vessels. This reduction leads to further increases in fuel consumption, transit time, and transportation costs. Reduction in channel widths reduces vessel efficiency.

(1) Socioeconomic impacts of no action.

(a) Noise. No longer maintaining the four projects or their respective features would reduce noise levels as navigation channels silted up and the volume of barge traffic declined. Noise from industries which use the waterways would also decline and eventually stop unless these companies find alternative means of transportation which would be economically feasible and environmentally sound.

(b) Esthetics. As mentioned in Section 4 of this report, esthetics involve subjective judgments; however, project construction has resulted in some alteration of the natural environment which may be evaluated as causing an adverse impact on the esthetics of the area. "No action" could cause a tendency for the area to return to its native state and from that standpoint have a beneficial effect on esthetics.

(c) Displacement of people, businesses, and farms. The projects were originally constructed to facilitate stability and growth of businesses and farms through flood protection, prevention of saltwater intrusion, and improved transportation supporting petroleum production. If the projects were not maintained, it is probable that activities of the businesses and farms currently benefiting from the projects would decline and some of the people working in these industries would lose their jobs, thereby causing the potential for displacement. A letter to the New Orleans District Office dated 12 May 1977 from the Mayor of Crowley ("The Rice City of America") indicated he supported consideration

of a plan proposed by the US Fish and Wildlife Service to regulate water levels in Grand and White Lakes at levels below mean high water. According to Mayor Joe Gielen, this could improve flood protection which he felt deserved a high priority. He indicated that, at the time the saltwater control structures were built, most irrigation was accomplished using surface water; but today most rice irrigation water is pumped from deep water wells. He stated many farmers who use surface water also maintain deep wells for back-up supply. From the standpoint of flood control, however, standard operating procedures during the threat of hurricanes include closing saltwater control structures to reduce tidal effects. Investigations by the US Fish and Wildlife Service and National Marine Fisheries Service indicate that opening the control structures intermittently to let water levels drop below mean high water more often would cause a net increase in amounts of commercially harvested fish and shellfish. Abandonment of the project navigation channels would cause services displacements since fishing and much of the area's mineral production require use of waterways. In addition, a portion of the area's agricultural production is shipped on project waterways. Discontinuing the maintenance of each and every feature of the four projects reviewed in this statement would cause displacements of businesses and some farms and the families of people employed by these businesses and farms.

(d) Employment. Allowing the waterways to eventually silt up would reduce their economic value to the point that some transportation employment would be adversely affected. Supporting sales and service businesses dependent on the waterways would likewise be impacted. Similarly, if the saltwater control structures were left open indefinitely, salt content in White and Grand Lakes would reduce utility of these lakes as a source of water for rice irrigation, adversely affecting employment associated with the agricultural sector. Conversely, employment in fishing and associated industries would be benefited by increased harvests as a result of opening the saltwater control structures.

(e) Community and regional growth. Petroleum production in the Mermentau Basin is important to the area as a source of employment and income. Any change in established transportation methods which would slow down activity would likely have a significant impact on both economic growth of the immediate area and the surrounding region. Adverse impacts to the rice industries would have a less severe, but nevertheless adverse effect, on community growth. Increases in commercial fishery harvests could only partially offset these adverse impacts on community and regional growth.

(f) Community cohesion. Existing maintenance programs have been supported by local officials. Any change in existing programs without their support could create friction within the community.

(g) Tax revenues. Abandoning maintenance of the waterways would cause a slowdown in mineral production, reducing, at least, temporarily severence tax revenues. Mineral industries have become so important to the tax bases of most of the local communities that any sharp reduction could have a significant adverse impact on their sources of revenue.

(h) Property values. Any reduction in maintenance would adversely affect the value of property protected. The value of farmland being irrigated and protected from saltwater intrusion would decline, perhaps sharply in some areas. The value of Grand and White Lakes as commercial fishing areas would increase.

(i) Public facilities and services. Discontinuance of maintenance of the waterways would eventually reduce if not negate the value of the subject Corps projects. It would also adversely affect local port and harbor facilities and the potential for economic growth which they could generate. At the same time, the cost to the taxpayer of maintaining the projects would be eliminated.

(j) Energy needs. As previously indicated, no action could result in a slowdown in the production of energy fuels. While use of pipelines has been a highly efficient means of transporting the vast quantities of crude petroleum produced in the Mermentau Basin so far, project waterways have been instrumental in oil exploration and transporting production from exploratory wells and those wells which have not produced in sufficient volume to economically justify construction of a pipeline. The construction of pipelines, in fact, has been greatly facilitated by the waterways which have been utilized for transporting pipe, equipment, supplies, and personnel to and from production locations. Stopping maintenance of the waterways could, therefore, inhibit production to some degree, depending on the actual amount of resources remaining in the basin and the economics of extracting them by other means.

(k) Safety. Cessation of maintenance would decrease the flood carrying capacity of certain streams which would represent adverse impact on human safety.

(l) Food requirements. Leaving the saltwater control structures open indefinitely would have significant adverse impacts on the area's rice production and beneficial impacts on fisheries production in the Grand and White Lakes system. As channels gradually would silt up, the lakes would become more saline and would not be a dependable source of fresh water for rice cultivation.

(2) Biological impacts of no action. No action would, in general, prevent destruction of aquatic and terrestrial habitat and result in a return to estuarine conditions in White and Grand Lakes if the two water control structures are not operated; i.e., left to remain open the year around. Specifically, saltwater commercial fishing would increase significantly inshore and offshore by restoring White and Grand Lakes to an estuarine system. In this case, USFWS assumed that production of white shrimp and blue crabs would be comparable to the average production of these organisms for western Louisiana estuaries. The approximately 83,000 acres of White and Grand Lakes would add about 1,095,000 pounds of white shrimp (119,420 pounds inshore harvest and 976,180 pounds offshore harvest) to the annual commercial harvest in coastal Louisiana. Similarly, an estimated 224,100 pounds of blue crabs would be added to the annual harvest. Sport shrimping and crabbing would also significantly increase as a result of leaving the water control structures open. Waterfowl and furbearer production would be increased due to lowered water levels in the marshes and by not destroying habitat during the deposition of dredged material. Keeping the gates open would slightly increase salinities in the fresh marshes surrounding Grand and White Lakes. Some of these marshes would probably revert to intermediate types.

b. Proposed operation schedules for control structures. Proposed alterations in operation schedules for the four control structures and locks have been outlined in letters from the USFWS dated 21 April 1976 and 1 April 1977. In a letter of 18 July 1977, NMFS concurred with and supported the USFWS plan. Operating schedules as proposed by the USFWS are outlined below:

(1) The control structures at Catfish Point, Schooner Bayou, Calcasieu Lock, and Vermilion Lock be operated to achieve water levels of approximately 1.5 to 1.8 feet m.l.g. during the period of July 1 to September 30, with any drawdown necessary to reach this level being completed by July 31. During the remainder of the year, the control structures should be operated to limit water levels to maximum elevations of 2.0 to 2.2 feet m.l.g.

(2) The control structures at Catfish Point and Schooner Bayou be opened during incoming tides for short periods which coincide with peak abundances of juvenile marine organisms near these structures in order to allow them ingress into the lower Mermentau Basin. The timing of this action will be determined in part by monitoring of these organisms by the Louisiana Wildlife and Fisheries Commission during known periods of peak abundance, usually during early spring and late summer to fall seasons. The operation of Schooner Bayou to achieve this goal may require coordinated operation of Freshwater Bayou Lock.

(3) A committee composed of at least one representative of the Louisiana Wildlife and Fisheries Commission, the National Marine Fisheries Service, the US Army Corps of Engineers, and the Fish and Wildlife Service be established to periodically review the operation of the Mermentau River, Louisiana, project, and formulate recommendations to the District Engineer deemed necessary to preserve or enhance the fish and wildlife resources of the area.

(4) Detailed studies be funded to evaluate methods of:

(a) Achieving more rapid release of waters contained in the Grand Lake-White Lake area and adjacent marshlands.

(b) Allowing post-larval and juvenile marine organisms to enter Grand and White Lakes during periods when the control structures are closed. This would involve an investigation of fishways, low sill weirs, or similar structures such as employed in other areas for such purposes.

c. New Orleans District response to the USFWS proposed operation schedule.

(1) The Fish and Wildlife Service letter of 1 April 1977 implies that the US Army Corps of Engineers operated the structures during 1976 to achieve water levels lower than those called for by its present plan of operation. This was not the case. The Corps operated the structures in accordance with the present plan of operation; however, rainfall was abnormally low during 1976, resulting in inside stages lower than normal. During an average year, operating the control structures to achieve inside water elevations of +1.5 to +1.8 feet m.l.g. from 1 July to 30 September will be impracticable on many occasions, since the outside stages are normally high during this time of year, with high tides normally between +2.0 and +3.0 feet m.l.g. and low tides often exceeding +1.5 feet m.l.g. In addition to the hydraulic problems, a decrease in water levels during this time of year will reduce the amount of freshwater available for irrigation. The Fish and Wildlife Service recommendation for stages of +2.0 to +2.2 feet m.l.g. for the balance of the year lies within the framework of the Corps' existing plan of operation (operating instruction c); however, factors other than fish and wildlife considerations may require water levels outside of the limits the USFWS recommends.

(2) The actual times of gate openings are coordinated with State fish and wildlife personnel. Benefits to fish and wildlife during 1976 are noted in the USFWS letter and can be attributed, at least in part, to the coordinated operation of the structure. Gate openings of

such short duration at Catfish Point will not significantly affect either the elevation nor salinity of the inside waters. Operation of the Catfish Point structure in this manner has been incorporated in the Operation and Maintenance (O&M) Manual since 1976, and the Corps will continue such operation in the future. Schooner Bayou will be operated in a similar manner; such directions were added to the O&M Manual in 1979.

(3) The Corps has considered carefully the recommendation that a committee be formed to periodically review and assess the operation of the project and to formulate recommendations specifically in the interest of preservation and enhancement of fish and wildlife resources of the area. The Corps does not believe that its representation on such a committee, if formed, is warranted at this time. To the extent that the Corps is able, it shall provide upon request information and assistance to such a committee. Furthermore, the Corps shall be pleased to afford any recommendations which may issue therefrom full consideration in its continuing review of the operation of the existing project.

(4) As an interim feature under the "Mermentau, Vermilion and Calcasieu Rivers and Bayou Teche, Louisiana Study," the Corps will conduct an investigation of the Grand and White Lakes area. This interim study, called the "Grand and White Lakes Water Management Study," will include flood control and irrigation, fish and wildlife purposes, and navigation as related to the Grand and White Lakes area. The study will not be constrained to the operation of the existing system with the prime purpose being an adequate supply of irrigation water, but will investigate all purposes stated above on an equal basis. The study has not been funded.

d. Beneficial impacts of proposed water control structure operation. Operation of the control structures as suggested by the USFWS and NMFS, and as outlined above, will accomplish two primary beneficial impacts: (a) permit ingress of larval marine forms into historically estuarine areas, and (b) increase valuable wildlife food and cover vegetation. Opening of Catfish Point and Schooner Bayou Control Structures for short periods during incoming tides when sampling indicates the presence of these organisms will permit larval shrimp, blue crabs, and other euryhaline species ingress into Grand and White Lakes and adjacent marsh and shallow areas. Using figures compiled for other Louisiana estuaries, it is estimated that nearly 1.1 million pounds of white shrimp, worth $791,360 at dockside, would be added to the annual Louisiana harvest. Similarly, it is estimated that an additional 224,100 pounds of blue crabs would be harvested, at a dockside value of $24,203.[1] Not only will commercial species benefit, but sportsfish will increase as a result of increased food supplies resulting from this operational plan.

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[1] US Fish and Wildlife Service (USFWS) letter, dated 21 April 1976.

The principal method used to increase valuable food and cover plants for wildlife is the use of drawdowns for various periods to expose the marsh floor. This exposure permits germination of desirable grass and sedge species as well as oxidation of marsh sediments. If allowed by outside stages, a 30-45 day drawdown during July, August, and September when less than 20 percent of rice irrigation occurs, should not seriously deplete irrigation water supplies in the Mermentau Basin. Drawdowns have historically resulted in increased waterfowl-use days in many areas, and increased hunter-use days especially in areas not previously hunted. In addition to increased waterfowl production, predator fish species (e.g., largemouth bass, gar, catfish) will benefit from concentration of forage fishes. Populations of overcrowded sunfishes, which are often stunted under such conditions, also will benefit from this action. Crawfish production is expected to increase; importance of crawfish as food for other forms of fish and wildlife has been widely demonstrated.

Production of nutria and muskrats, important furbearers in the basin, will increase in response to increased food supplies and available habitat as a result of the recommended water management program. Erosional rates along the shorelines of Grand and White Lakes should decrease as a result of lowered water levels.

e. Relocation of irrigation structures. NMFS, in a letter dated 19 July 1977, has recommended that the location of irrigation intakes be moved further from Schooner Bayou Control Structure. This would allow greater flexibility in operation of the structure.

SECTION 7--THE RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF MAN'S ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

7.01 GENERAL

The short-term use of man's environment involves snagging and clearing operations, dredging project channels to authorized specifications, and deposition of dredged material on land or in open water. Dredged material disposal areas were designated in previous resource allocation decisions. However, the entire acreage has reverted to marsh; therefore, the project represents a loss of long-term productivity associated with renewable marsh resources. Furbearer and waterfowl habitat, as well as habitat for other marsh wildlife, will be lost due to disposal on marshes. Immediate physical effects on the areas are local and short-term. These include loss of bottom-dwelling organisms, loss of vegetation, resuspension of sediments, reduced photosynthetic activity, and forced relocation of mobile marine and terrestrial species. Disturbed areas will eventually revegetate, and associated wildlife will return. Continued maintenance will delay actual return to previous conditions. Operation and maintenance procedures maintaining increased water levels in the Grand Lake/ White Lake area result in a continued erosion of some marshes. Bottom-dwelling and motile marine organisms will repopulate with species similar to those destroyed. Where high ground is created, loss of estuarine habitats will cause decreased sport and commercial fish and shellfish production for those species which use marshes as breeding and/or nursery areas. Slight decreases in fisheries harvests may occur as a result, but, with subsidence, dredged materials should revert to productive wetlands within a few years. Maintenance operations have long-term implications on continued economic development of the area by facilitating low-cost shipment by water of commodities of national and international markets. Maintenance operations, including clearing and snagging, could lead to expansion and/or development of residential, recreational, and/or commercial facilities along certain stretches of the four projects. However, no sizeable long-term changes in land-use trends are expected because of the projects.

7.02 WATER CONTROL STRUCTURES

Current operation of the Catfish Point and Schooner Bayou Control Structures is to benefit navigation, flood control, and provide freshwater for rice growing interests. Section 1.01 outlines these procedures. The USFWS has proposed alternative water control procedures for these structures which are listed in Section 6.02b of this EIS. The structures are now operated to allow limited ingress of marine organisms.

The long-term impact of such operation will be the loss of some freshwater species in the Grand and White Lakes; however, in general, the marshes will remain fresh since very little saline water will be introduced. In addition, increased salinity levels will occur in the lakes at certain times, primarily at times other than those when water will be withdrawn for rice irrigation (e.g., 31 July - 30 September). Long-term benefits for fisheries and wildlife will be reavailability of habitat previously utilized by marine species, especially shrimp and crabs, revegetation of shoreline plants valuable as animal food, and the reintroduction of plant detritus into estuarine and marine food webs. The 1976 test operation program appeared not to have conflicted with other project purposes, namely flood control, navigation, or rice irrigation.

SECTION 8--ANY IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES WHICH ARE INVOLVED IN CONTINUED OPERATION AND MAINTENANCE

Labor, material, and capital resources expended during the routine maintenance of the projects are irretrievable commitments of resources. Previously committed land and underwater disposal areas will be lost to the ecosystem as habitat, but the water bottoms will soon revert to a productive part of the environment. Plants on the marshes will be destroyed, but with subsidence, within a few years similar communities should revegetate. Maintaining the existing works for the purposes of sustaining flood protection, providing low-cost waterborne transportation, and well as providing a large freshwater supply for rice irrigation is accomplished at the cost of the resources required for maintenance work plus restriction in annual production of commercially harvested fish and shellfish. Increasing demands for shrimp and crabs have prompted the Corps to participate in studies investigating benefits of periodic openings of the Catfish Point and Schooner Bayou Control Structures to allow larval crustaceans entrance into Grand Lake so they can mature and be harvested. Some of the fishery resources currently foregone due to project operation and maintenance represent irreversible and irretrievable resources; however, with proper management, the fishery resources of the basin can be replenished.

SECTION 9--COORDINATION AND COMMENT AND RESPONSE

9.01 PUBLIC PARTICIPATION MEETING

A meeting relative to water use problems in the Lower Mermentau Basin was held at the New Orleans District Office in April, 1977, with local interests. Representatives discussed their positions relative to the April 25th USFWS letter report regarding current and possible alternate water level operations and regulations of Mermentau Basin waters.

9.02 *GOVERNMENT AGENCIES*

The draft environmental statement was sent to the following Governmental agencies requesting their comments. Their comments are summarized below and appropriate responses are included. Letters of comment received are attached as Section XI.

a. Federal agencies

(1) US DEPARTMENT OF THE INTERIOR, OFFICE OF THE SECRETARY, SOUTHWEST REGION

Comment 1: "Page I-1, paragraph 1.01 - We believe that the spoil banks on the west bank of the Freshwater Bayou Canal now represent the eastern boundary of the Mermentau Basin and suggest this boundary be reflected in this paragraph and in Plate I (Page II-2)."

Response: Project boundaries have been modified to incorporate this comment (see page 1-1).

Comment 2: "Page I-3, paragraph (3) - Based on our areas of expertise it is questionable as to whether losses are being minimized and distributed equitably to all interests concerned. The project is being operated to maximize agricultural water use and navigation, with only secondary attempts to minimize losses to estuarine fishes and wetland habitat. The present operational plan for the water control structures discussed in this paragraph is at variance with plans utilized from the time the project was completed until 1962. The authority to operate the project, as is done presently, should be documented in this section with special references to the Congressional legislation that originally authorized project construction."

Response: The River and Harbor Act of July 1946 authorized construction, repair, and preservation of this project in accordance with the plans and subject to the conditions recommended by the Chief of Engineers in the reports hereinafter designated. The Act also provided that the provisions of Section 1 of the River and Harbor Act approved 2 March 1945 shall govern with respect to plans, proposals, or reports for works of improvement for navigation or flood control and for irrigation and purposes incidental thereto. The Detailed Project Report (DPR) which was prepared by the New Orleans District of the Corps of Engineers pursuant to the project authorization proposed a plan "for initial operation until experience indicates need for modification." This plan was considered to be flexible and "devised to meet, insofar as possible, all of the requirements of" the US Fish and Wildlife Service, the Louisiana Department of Wildlife and Fisheries and the Louisiana Department of Public Works, after consultation with those agencies. It was expressly recognized in the DPR that, "The requirements for rice irrigation, flood control, navigation, fish and wildlife, and drainage, are quite divergent and vary with the seasons and with hydrologic and meteorologic events, and one or more interests could be adversely affected with varying degrees of severity, unless the needs of all were considered. Consequently, a flexible plan of regulation, based on current data and conditions, is deemed essential in order to obtain the maximum benefits to the project and to minimize and distribute losses equitably to interests concerned." The range and quality of conditions precedent to development of the operation plan set forth in the DPR did not persist through the early years, and, consequently, the plan of operation was altered to optimize the benefits from those improvements that were basic to authorization of the project. Alteration of the plan was considered an advisable remedy within the context of the DPR and consistent with minimization of loss of benefits attainable under the prevalent conditions and an equitable distribution of losses to interests concerned.

Comment 3: "Page I-4, paragraph (3)(b) - This paragraph should also indicate the stage which would require opening of the Schooner Bayou Control Structure to maintain minimum water levels in the Lakes."

Response: As discussed on page 1-7, Schooner Bayou is opened to allow ingress of juvenile shrimp and crabs. There are no set stages for such an opening, the only requirement is that outside stages exceed inside stages.

Comment 4: "Page I-4, paragraph (3)(c) - The maximum water levels that will be maintained by gate closure should be defined in this section. Here again, it appears that operation of the control gates is not providing optimum overall results, especially when one considers the adverse impact of higher water levels on marsh vegetation and associated wildlife values."

Response: Due to the many diverse interests that are affected by water stages in the basin, operating plans are designed to provide optimum flexibility for satisfying the various needs.

Comment 5: "Page I-4, paragraph (3)(e) - This paragraph would be clarified if it showed that the operation of Catfish Point Control Structure to permit ingress of juvenile shrimp and crabs was recently implemented in 1976, at the request of the Fish and Wildlife Service (FWS), the National Marine Fisheries Service, and the Louisiana Department of Wildlife and Fisheries."

Response: This has been done on page I-7.

Comment 6: "Page I-4, paragraph c (1) - This paragraph should be expanded to better describe the extent of work which has been completed on the Mermentau River and Bayou Nezpique and Des Cannes project."

Response: This operation and maintenance EIS no longer considers the Mermentau River and Bayous Nezpique and Des Cannes, Louisiana, project since it is only partially completed and under economic reanalysis. If and when it is completed, an operation and maintenance EIS will be prepared.

Comment 7: "Page I-7, paragraph (b) - The Cameron Creole Watershed project, being planned by the Soil Conservation Service, adjoins the western boundary of the Mermentau Basin. Present plans call for diversion of excess fresh water from the Mermentau Basin into the East Cove Marsh area just east of Calcasieu Lake to reduce salt water intrusion and increase wetland projectivity. The interrelationship between this project and the Mermentau River project should be briefly discussed in this section."

Response: The paragraph (page I-9) has been modified to reflect this input.

Comment 8: "Page II-1, paragraph 2.01 - As we stated above we believe that the eastern boundary of the basin includes the area up to the spoil banks on the west bank of the Freshwater Bayou Canal."

Response: See response to USDI comment 1 above.

Comment 9: "Page II-11, paragraph e - Appendix A is referenced but not included in the statement. If this is not to be included we suggest that hydrological data for the basin be summarized and included in the body of the statement to aid the reader in understanding this aspect of the project."

Response: Water quality is summarized in Tables 2 - 4.

Comment 10: "Page II-20, paragraph d - It should be pointed out that bottomland forest and wooded swamp habitats also occur along Bayou Plaquemine Brule."

Response: The paragraph (page II-23) has been modified to include this input.

Comment 11: "Page II-20, paragraph e - This section should be expanded to briefly describe the role of marshes, wooded swamps, and seasonally flooded bottomland hardwood forests in fish and crawfish production, export of organic detritus, and maintenance of water quality. In addition, the source(s) of information used to describe the vegetation of the project area should be provided. Two sources not cited which contain much valuable information on the vegetation of the area include:

Montz, G.N. 1977. A Vegetative Study of the White Lake and Vermilion Bay, Louisiana, Area. US Army Corps of Engineers, New Orleans District, Regulatory Functions Branch, New Orleans, Louisiana. 28pp.

Valentine, J.M., Jr. 1977. Plant Succession After Saw-grass Mortality in Southwestern Louisiana. Proceedings of the Southeastern Association of Game and Fish Commissioners 30:634-640.

Both Montz (referenced above) and Chabreck[1] reported that saltmeadow cordgrass (wiregrass) was abundant in the fresh marshes of the lower basin."

Response: The above sources have been consulted and pertinent information has been incorporated into Section 2.04. Paragraph 2.04 i on page II-25 has been rewritten to more fully describe the value of project wetlands.

Comment 12: "Page II-21, paragraph g - Observations by FWS biologists have shown that bladderworts (Utricularia spp.), Nitella (Nitella gracilis), and white water lily (Nymphaea odorata) are also common in the fresh marshes of the area."

Response: The paragraph (page II-24) has been modified to include this input.

[1]Chabreck, R.H. 1972. Vegetation, Water and Soil Characteristics of the Louisiana Coastal Region. Louisiana State University, Agricultural Experiment Station, Baton Rouge. Bulletin No. 664. 72 pp.

Comment 13: "Page II-22, paragraph 3 - The fulvous whistling duck is a common nester in the rice fields of the basin, and uses the marsh as resting and feeding habitat. Purple gallinules also nest in the fresh marshes of the area, especially in Lacassine Pool of Lacassine National Wildlife Refuge. The magnitude of the waterfowl use of the basin cannot be overemphasized. Waterfowl biologists from our FWS have estimated that peak populations of 750,000 to 1 million ducks, 125,000 lesser snow geese, and 22,000 white-fronted geese winter in the Mermentau Basin."

Response: The paragraph (page II-26) has been modified to include this input.

Comment 14: "Page II-23, paragraph 4 - This paragraph should be revised to include a discussion of the seabird and wading bird colonies located in the project area. These were documented in a recent study conducted for our FWS[2] and are listed as follows:

Colony No.	Latitude	Longitude	Species
158004	29° 46'	92° 56'	great egret, olivaceous cormorant, roseate spoonbill, snowy egret
158005	29° 47'	92° 54'	Louisiana heron, snowy egret
158006	29° 56'	92° 53'	anhinga, black-crowned night heron, great egret, olivaceous cormorant, great blue heron
158007	29° 59'	92° 52'	anhinga, black-crowned night heron, cattle egret, Forester's tern, great blue heron, great egret, little blue heron, Louisiana heron, olivaceous cormorant, roseate spoonbill, snowy egret, white-faced ibis, white ibis

[2]Louisiana Cooperative Wildlife Research Unit. 1977. Colonial Sea and Wading Bird Survey, Final Report. US Fish and Wildlife Service Contract Number: 14-16-0008-1187.

Colony No.	Latitude	Longitude	Species
158008	20° 53'	92° 35'	anhinga, black-crowned night heron, cattle egret, great blue heron, great egret, little blue heron, Louisiana heron, olivaceous cormorant, roseate spoonbill, snowy egret, white ibis
158009	29° 41'	92° 12'	black skimmer, least tern
158014	29° 44'	93° 01'	least tern "

Response: The paragraph (page II-26) has been modified to reflect this input. No colonies of seabirds and/or wading birds will be affected by the proposed maintenance.

Comment 15: "Page II-24, paragraph 8 - The monetary importance of recent alligator harvests in the study area is substantial and should be briefly discussed in this section."

Response: This has been attempted via correspondence to LW&F but to date no response has been received.

Comment 16: "Page II-25, paragraph b(1) - Other commercial fishes occuring in the lakes and streams of the project area include flathead catfish, yellow bullhead, smallmouth buffalo, and carp. The major freshwater sportfishes of the area were not mentioned in this paragraph. These include largemouth bass, white crappie, black crappie, bluegill, redear sunfish, and warmouth. Many of these species are abundant in the canals that occur in the marshes of the project area."

Response: This paragraph (page II-28) has been modified to reflect this input.

Comment 17: "Page II-25, paragraph b(2) - The discussion of the estuarine fishery resources of the project area is not complete. Information derived from samples and catch records should be used to document the occurrence, relative abundance, and harvest of the more common estuarine fishes and shellfishes. A comparison of pre-project and post-project conditions is contained in the April 21, 1976, special follow-up report prepared by our FWS. Additional information can be obtained from the Louisiana Department of Wildlife and Fisheries and the following publications:

Morton, T. 1973. The Ecological Effects of Water Control Structures on an Estuarine Area, White Lake, Louisiana, 1972-1973. M.S. Thesis, University of Southwestern Louisiana.

Gunter, G., and W.E. Shell. 1958. A Study of an Estuarine Area with Water Level Control in the Louisiana Marsh. Proceedings of the Louisiana Academy of Science 21:5-34.

A full discussion of the projects effects on estuarine fishery resources should be added to this section."

Response: The paragraph (page II-28) has been rewritten to reflect this input. Harvest of fishery resources is discussed in paragraph 2.05 b(4)(a). Impacts on the estuarine fishery resources are discussed in paragraph 4.02 b(5).

Comment 18: "Page II-25, paragraph b(3) - Crawfish are considered to be more typically residents of fresh marshes, rice fields, and wooded swamps, and not the lakes of the project area. The harvest of blue crabs in the project area should also be discussed."

Response: The paragraph (page II-29) has been modified to reflect this input. Potential blue crab harvest is discussed in section 2.05(4)(a).

Comment 19: "Page II-26, paragraph (4)(a) - The harvest of freshwater and estuarine commercial fishes and shellfishes from the Mermentau Basin should be estimated by species or major species group. For estuarine/marine species, the data should be segregated between inshore harvest and related offshore production. Data should be presented for the last 5 years, which incidentally would show the benefits of the recent change in the operation of the Catfish Point Control Structure."

Response: Available harvest data are now included in paragraph 2.05 b (4) on page II-30.

Comment 20: "Page II-26, paragraph (4)(b) - Other important saltwater sportfishes not included in this section are red drum, black drum, Atlantic croaker, and southern flounder. Ponds and borrow areas are not considered significant sport fishing areas in the Mermentau Basin. Most of the sport effort is associated with Lacassine Pool at Lacassine National Wildlife Refuge, the numerous marsh lakes bordering Grand Lake and White Lake, the Big Burn marsh north of Little Cheniere, Lake Arthur, and the larger unchannelized stream segments in the area, including the Mermentau River."

Response: This paragraph (page II-30) has been modified to reflect this comment.

Comment 21: "Page II-27, paragraph (b) - We recommend that the final statement contain the results of the proposed cultural survey. In addition, the final statement should include the comments of the State Historic Preservation Officer and the Advisory Council on Historic Preservation concerning the project's impacts on cultural resources and proposed mitigation measures."

Response: A cultural resource survey will be undertaken prior to scheduled maintenance dredging. The survey has not been completed prior to submission of the Final EIS to the EPA. As of June 1981, no comment has been received on this EIS from either the State Historic Preservation Officer or the Advisory Council on Historic Preservation. They were mailed copies of the EIS in June 1979.

Comment 22: "Page II-32, paragraph 2.09 - For comparison purposes this section should also discuss the impacts of the return of the Grand Lake/White Lake area to estuarine conditions. In addition, the fishery productivity of the streams presently being channelized should be compared to the productivity of those streams, had the projects not been implemented or maintained."

Response: The paragraph (page II-36) has been changed as suggested. However, productivity of cleared and snagged streams is only compared to the pre-maintenance productivity since this EIS only considers impacts of maintenance.

Comment 23: "Page III-1 - This section should be expanded to discuss the impacts of the present water level management practices followed in the Grand Lake/White Lake area on the productivity of the unimpounded portions of Lacassine National Wildlife Refuge. Prior research on Lacassine Refuge has demonstrated poor production of important waterfowl food plants when Mermentau Basin water levels are held above 1.8 feet mean low gulf (m.l.g.) during the summer months. The impacts that maintaining summertime water levels of 2.0 feet m.l.g. or greater by operation of the water control structures of the Mermentau River project are having on the marshes of Lacassine National Wildlife Refuge should be discussed."

Response: These impacts are discussed in paragraph 3.02 on page III-1.

Comment 24: "Page IV-2, paragraph (4)(b) - It is stated that the excavation of streams in the upper portions of the Mermentau Basin was necessary to enhance transport of commercial fishes. It should be pointed out that channelization causes a serious decline in fish production, and continued maintenance of the project area streams will serve to perpetuate this reduced productivity."

AD-A126 609 COMPOSITE ENVIRONMENTAL STATEMENT FOR OPERATIONS AND MAINTENANCE OF FOUR PROJECTS IN THE MERMENTAU BASIN LOUISIANA(U) ARMY ENGINEER DISTRICT NEW ORLEANS LA 2/3

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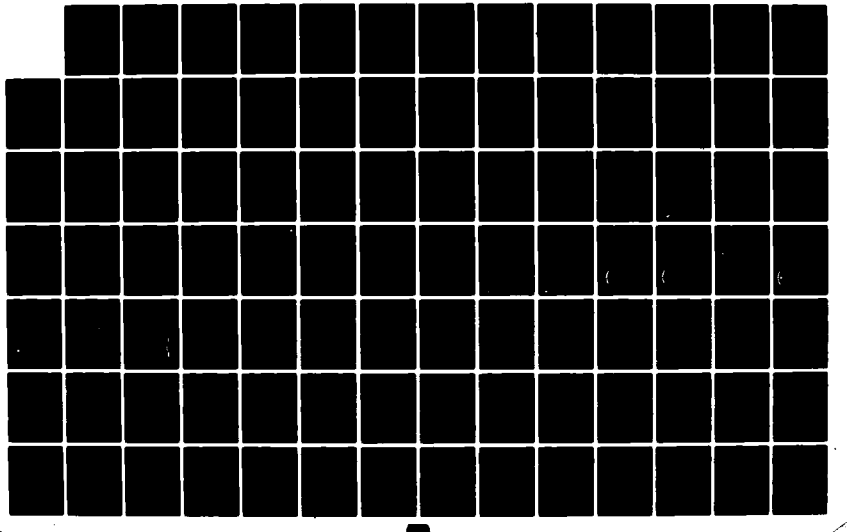
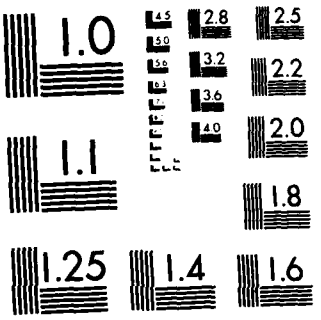




Response: The adverse impacts on the fishery of the planned maintenance work are discussed under the revised Section 4.02 b and (5) on pages IV-3 and IV-10, respectively.

Comment 25: "Page IV-3, paragraph b(3) - We do not agree with the statements in this section which indicate that wildlife impacts will necessarily be minimal at maintenance spoil sites. If maintenance is not required until 10 or more years after construction, plant succession may allow substantial recovery in wildlife values. Thus, maintenance spoil disposal following such vegetaion recovery will have substantial adverse impacts."

Response: The statement in question referred to sites on the Mermentau River, Bayous Nezpique and Des Cannes. The statement has been deleted since this EIS no longer considers that project.

Comment 26: "Page IV-5, paragraph (c) - The statement anticipates, as secondary groundwater impacts, increased withdrawals with resultant water-level declines and saltwater encroachment. We suggest that the summary of probable indirect or secondary impacts should address, at least in a general manner, the possibility of increased land subsidence."

Response: The paragraph (page IV-9) has been modified to incorporate this comment.

Comment 27: "Page IV-6 (8)(c) - The last sentence in this paragraph should be corrected. The New Orleans District Corps of Engineers has not formally agreed to operate the Schooner Bayou Control Structure in the manner requested by our FWS."

Response: The last half of the paragraph (page IV-13) has been deleted, but it should be pointed out that the Schonner Bayou Control Structure is now operated to allow the ingress of marine organisms when this procedure is not detrimental to other interests. This operating procedure was included in the O&M manual in 1979.

Comment 28: "Page IV-8, paragraph (13) - Degradation of aesthetics may be considered severe where spoil disposal occurs near extensive camp site developments along the middle and upper Mermentau River. This impact should be recognized in the statement."

Response: The paragraph (page IV-14) has been modified to include this comment.

Comment 29: "Page IV-8, paragraph (c) - It should be clearly pointed out that the project area marshes were not brackish and saline prior to construction of the water control structures at Catfish Point and Schooner Bayou, as is implied in this paragraph."

Response: The paragraph (page IV-15) has been corrected to indicate that intermediate marsh species were replaced by fresh marsh plants.

Comment 30: "Page IV-9, paragraph b - This paragraph should state the acreage of lake bottom that would be affected by disposal of dredged material."

Response: The Lake Arthur segment of the draft EIS has been deleted from the FEIS.

Comment 31: "Page V-2, paragraph 5.06 - This paragraph should be modified to state that the high water levels maintained in the lower basin are partly responsible for the severe bank erosion along Grand and White Lakes."

Response: The paragraph (page V-2) has been modified to reflect this comment.

Comment 32: "Page VI-1, Structure Alternatives - The alternative of using agricultural land in lieu of wetland disposal sites, such as in the Lake Arthur reach, should be explored. Creation of wetland habitat in the Lake Arthur area with spoil should also be considered and adequately discussed."

Response: The Lake Arthur reach is no longer a part of this EIS (see Change Sheet). There is little or no agricultural land adjacent to the reaches of the Mermentau River project.

Comment 33: "Page VI-3, paragraph c(1) - A much more detailed explanation is needed regarding the infeasibility of implementing the drawdown recommended by the FWS. It is not clearly stated why the recommended drawdown cannot be included as an objective of the operational plan to be achieved to the extent allowable by prevailing tidal and runoff conditions. To simply state that the recommended drawdown '...will be impracticable on many occasions...' is not a justifiable reason for rejection of those recommendations. The feasibility of reducing stages to 1.8 feet m.l.g., instead of 1.5 to 1.8 feet m.l.g. as previously recommended by the FWS, should also be discussed. This elevation would presumably be easier to attain, and would still allow for germination of valuable waterfowl food plants in the 200,000 acres of fresh marsh affected by the project, including a major portion of Lacassine National Wildlife Refuge. This paragraph should also discuss in adequate detail the

nature of the '... factors other than fish and wildlife considerations ...' that might require water levels outside the 2.0 to 2.2 feet m.l.g. recommended by the FWS for the non-drawdown period."

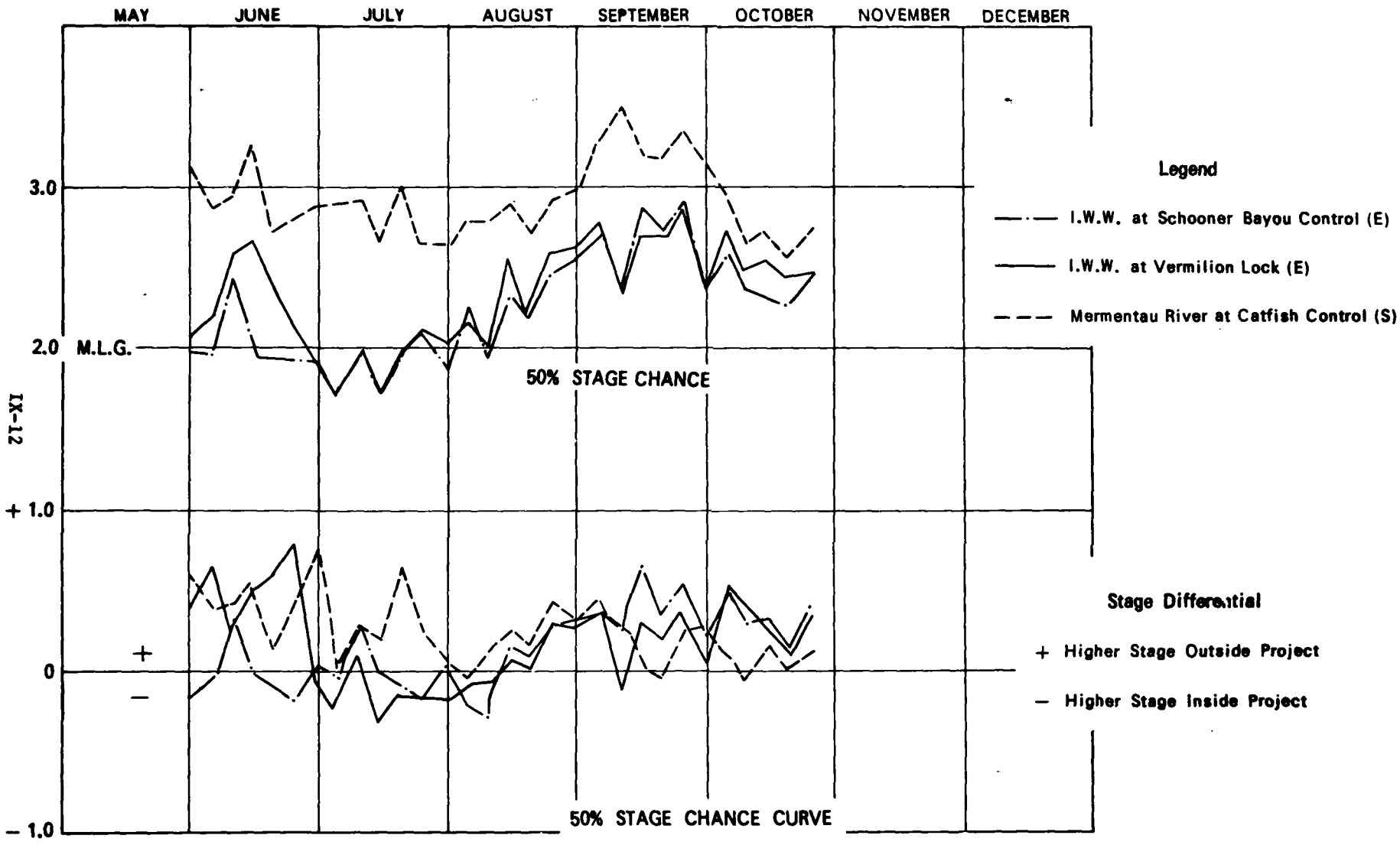
Response: As stated in paragraph c(1) of Section 6.02, we feel that maintaining a stage of 1.5 to 1.8 feet m.l.g. in the project would be improbable as well as impractical, since stages outside of the project are too high during the 1 July to 30 September period. The attached Plate shows the 50% stage chance curve for the outside stage of Catfish Control Structure, Schooner Bayou Control Structure, and Vermilion Lock. This curve would represent an equivalent to the median stage. These curves indicate the median stage for Catfish never goes below 2.0 feet m.l.g. during this time period, and that Schooner Bayou Control Structure and Vermilion Lock median stage is below 2.0 feet m.l.g. only in July. This Plate also contains a stage differential curve for these structures which indicates stages on the inside being higher at Schooner and Vermilion only in July and early August; Catfish Control Structure has higher outside stages for the entire period. According to the National Weather Service normals (1941 -1970) for Hackberry, LA (table below), the months of July and August are also the months with the highest rainfall. This would mean that the release of water from the project would be necessary to keep up with the inflow from rainfall during this period.

Normal Monthly Precipitation 1941-1970
Hackberry, LA

Jan - 4.14	Jul - 6.83
Feb - 3.91	Aug - 6.02
Mar - 3.36	Sep - 4.75
Apr - 3.78	Oct - 3.44
May - 4.36	Nov - 4.27
Jun - 4.37	Dec - 4.71

Comment 34: "Page VI-3, paragraph c(2) - It should be specified whether the coordinated operation of Catfish Point Control Structure in the manner requested by the FWS will be or has been written into the operational manual or other official instructions to be adhered to by Corps field personnel responsible for operation of that structure."

Response: The coordinated opening of Catfish Point Control Structure has been included in the O&M Manual since 1976, and this fact is noted in paragraph 6.22 c (2).


MAY
JUNE
JULY
AUGUST
SEPTEMBER
OCTOBER
NOVEMBER
DECEMBER
3.0
2.0 M.L.G.
+ 1.0
0
– 1.0
+
–
IX-12
50% STAGE CHANCE
Legend
I.W.W. at Schooner Bayou Control (E)
I.W.W. at Vermilion Lock (E)
Mermentau River at Catfish Control (S)
Stage Differential
+ Higher Stage Outside Project
– Higher Stage Inside Project
50% STAGE CHANCE CURVE
(OUTSIDE STAGE)
CATFISH POINT CONTROL STRUCTURE
SCHOONER BAYOU CONTROL STRUCTURE
VERMILION LOCK

Comment 35: "Page VI-4, paragraph (3) - We note the Corps decision not to participate in a committee recommended to periodically review and assess the operation of the Mermentau River project and formulate recommendations specifically designed to preserve and enhance fish and wildlife resources. In view of the fact that the existing ongoing study of Mermentau, Calcasieu, and Vermilion Rivers, and Bayou Teche is examining the advisability of modifying the existing Mermentau River project, it would seem that such a committee would provide an excellent opportunity to suggest operational changes designed to improve environmental quality. This would be in keeping with the intent of the Fish and Wildlife Coordination Act that fish and wildlife shall receive equal consideration with other purposes of Federal water development projects."

Response: Currently, it is not believed proper to establish a fish and wildlife oriented committee to dictate the operation of the project. First, the operating procedures defined herein will be followed. Second, there are many interests other than fish and wildlife concerned. In the unlikely event a committee were established, it would have to include representatives of other interests which could be impacted by project modification. These include, but are not limited to, agriculture, trapping, oil and gas production, navigation, pipelines, landowners, local residents, and local government bodies.

Comment 36: "Page VI-4, paragraph (4) - This paragraph indicates that the FWS recommended studies of project modifications designed to facilitate drawdown and permit easier ingress of post-larval and juvenile shrimp into Grand and White Lakes will be initiated in the foreseeable future. If this is the situation it would appear that a low priority has been placed on fish and wildlife aspects of the ongoing survey study. This is not in keeping with the requirement of the Fish and Wildlife Coordination Act that fish and wildlife be given equal consideration with other project features. This discrepancy should be clarified."

Response: The studies referred to will not commence during this fiscal year. The "Mermentau, Vermilion, and Calcasieu Rivers and Bayou Teche, Louisiana," study is a continuing one. There are more than 25 separate features to be addressed as funds and personnel constraints allow. It cannot be stated with any degree of certainty when any particular item will be studied. Fish and wildlife studies will begin at the earliest practicable time.

Comment 37: "Page VI-4, paragraph (d) - This paragraph should clearly spell out that the benefits discussed are associated with implementation of the plan recommended by the FWS in its special follow-up report of April 21, 1976. Certain features of that plan have not been officially adopted by the Corps including operation of Schooner Bayou Control Structure to permit ingress of marine organisms and seasonal drawdowns for waterfowl food plant production. If the plan is not implemented the benefits will not occur. This should be recognized in the statement."

Response: As described in paragraph 1.02 b(3)(e), operation of Schooner Bayou Control Structure to provide for ingress of marine organisms has been included in the O&M Manual in 1979.

Comment 38: "Page VI-7, paragraph 1 - The rationale used to reach the conclusion that silting up of project channels will reduce commercial fishing benefits is unclear, as Grand Lake and White Lake functioned as a low-salinity estuary prior to project construction. This should be clarified."

Response: The paragraph (page VI-4) has been rewritten for clarification.

Comment 39: "Page VII-1, paragraph 7.01 - We do not agree with the statement that the project represents no loss of long-term productivity associated with renewable marsh resources; wetland associated wildlife productivity in the 1,800 acres of wetlands designated as disposal areas will be greatly reduced. Additionally, project operation is causing continued marsh deterioration as a result of increased water levels being maintained in the Grand Lake/White Lake area. This statements should be revised."

Response: The paragraph (page VII-1) has been rewritten for clarification.

Comment 40: "Page VII-1, paragraph 7.02 - The statement that the FWS-recommended changes in operational procedures for the water control structures at Catfish Point and Schooner Bayou were implemented is only partially correct. As discussed previously, only the operation of Catfish Point Control Structure was altered to permit shrimp and crabs to enter these waters. The seasonal drawdowns and operation of Schooner Bayou Control Structure to permit marine organisms ingress were not accomplished through altered project operation. We do not agree with the long-term impact projection that the fresh marsh plant association will be converted to a more brackish marsh plant association. It is our opinion that water salinities will remain within the tolerances of fresh marsh species, since only small amounts of salt water would be introduced. This view is supported by paragraph c(2) on page VI-3 of this statement."

Response: The paragraph (page VII-1) has been corrected to indicate that the marshes will remain fresh.

(2) US ENVIRONMENTAL PROTECTION AGENCY, REGION VI

Comment 1: "Due to the absence of a Section 404(b)(1) evaluation within the Draft EIS, we assume that it is the intent of the Corps of Engineers not to seek a 404(r) exemption. We would appreciate it if the Final EIS would acknowledge the validity of this assumption."

Response: Since 404(r) does not apply to operation and maintenance projects, in accordance with 404(t) the 404(b)(1) Evaluation will be promulgated with the public notice and a 401 Certificate will be obtained from the State of Louisiana. The 404(b)(1) Evaluation is also appended to this EIS as Appendix D.

Comment 2: "The description of the proposed work provided in the Draft EIS is very general in nature. It would strengthen the Statement if the Final EIS would discuss in greater detail the volumes of dredge material to be excavated; the location and land use patterns of the disposal areas; and the acreages, types and the relative values of the wetland areas to be destroyed or adversely impacted. This information is necessary to allow thorough impact evaluation of the proposed project actions."

Response: A chart with much of the suggested information has been added to Section 1.02 on pages I-4 and I-5.

Comment 3: "The Final EIS should discuss any adverse impacts the water control structures may impose upon the normal migration, spawning, and feeding habits of the fish and shellfish species affected. The impacts of the blockage of migration routes as well as fluctuations in water levels in channels and adjacent wetlands should also be discussed."

Response: These impacts are discussed in paragraph 4.02c on page IV-15. This paragraph is revised to include even more detail.

Comment 4: "Additional information on the projected uses of the water stored by the water control structures should be addressed in the Final Statement. Specifically, the Final EIS should identify the acreages of cropland in the project vicinity, the acreages of cropland under irrigation, the approximate volume of water required, and the percentage of irrigation water taken from irrigation wells within the project study area. This information will assist in evaluating the stated project need and projected benefits."

Response: The 1974 Louisiana Census for Agriculture (US Dept. of Commerce, Bureau of Census, Vol. 1, Part 18) provides the following information:

	Cropland Harvested	Harvested Croplands Under Irrigation	Approximate Water Required
Acadia	201,848 ac	113,902 ac	162,526 acre feet
Cameron	23,212 ac	17,069 ac	20,399 " "
Jefferson Davis	215,277 ac	121,025 ac	189,888 " "
Vermillion	268,656 ac	138,542 ac	172,843 " "

Information on projected water uses and percent of water taken from wells, although thought to be increasing, is unavailable.

Comment 5: "Appendix A, which is referenced on page II-11, is not contained in the Draft EIS. This information should be included in the Final Statement."

Response: Summarized water quality data is included in Tables 2 - 4.

(3) US DEPARTMENT OF COMMERCE, NATIONAL MARINE FISHERIES SERVICE

Comment 1: "The DEIS is very general in documenting the need for continuance of all facets of the four projects. Since the majority of the anticipated adverse impacts of project maintenance will affect fish and wildlife resources only, it would seem appropriate to mitigate or offset these impacts through project modifications, whenever possible, to obtain overall beneficial impacts to all interests from continued project implementation. This could be obtained by incorporating changes in control gate operation procedures as first recommended by the United States Fish and Wildlife Service (FWS) with NMFS concurrence on April 21, 1976, and again by FWS on April 1, 1977 and by NMFS on July 19, 1977. Implementation of the FWS and NMFS plan for control gate operation would greatly enhance the project area's contributions to marine fishery resources by allowing the project area to at least partially function as an estuarine nursery for early life stages of marine fishery resources. Since the projects should be maintained to serve multiple purposes, including fish and wildlife resources, we believe the Final Environmental Impact Statement (FEIS) should more thoroughly address the FWS and NMFS recommendations. In addition, the FEIS should include those studies which have been deferred until fiscal year 1980 that are tantamount to resolving the Corps objections for not implementing the FWS and NMFS recommendations."

"The FEIS should also discuss the value and importance of marshes and other wetlands in more detail. Specifically, information on the role of these wetlands in fishery production, their value and the economic importance of the fishing industry which relies on fishery resources would be appropriate."

Response: The Schooner Bayou Control Structure in the future will be operated to allow ingress of juvenile marine organisms; the operation Manual was so changed in 1979. A new study of the lower Mermentau Basin is being initiated; it will comprehensively study the water problems with an eye to improving fish and wildlife productivity. The value of the area wetlands is discussed in paragraphs 2.04 b to j, 2.05 a(8), 2.05 b(4)a and b.

Comment 2: "Page I-1, paragraph 1.01 Name and Location - The FEIS should note that project impacts and influence extend well past State Highway 82 on the eastern side of the project area."

Response: Project boundaries have been re-defined to extend to the west bank of Freshwater Bayou.

Comment 3: "Page I-3(3) Operation of water control structures- A discussion of the conditions that dictated the change in operations initiated in 1962, which apparently resulted in decreased benefits to fishery resources, should also be presented."

Response: We have no backup documentation supporting those changes in operation initiated in 1962.

Comment 4: "Page I-4, paragraph (d) Stage Conditions - This operational procedure should present relative stage conditions in feet (M.S.L.) which could be expected to optimize overall benefits during the stated period. Also, when conditions are optimum for fishery benefits, the coordinated opening of Freshwater Bayou Lock with Schooner Bayou Control Structure would further benefit fishery production."

Response: No specific stage can be set that would optimize benefits under all conditions. Relative stage conditions that would optimize overall benefits will vary according to the prevailing weather conditions, stages, predictions, and other factors. As discussed in Response 1 above, Schooner Bayou is now opened to allow ingress of marine organisms.

Comment 5: "Page I-4, paragraph (e) - This paragraph implies that the Catfish Point Control Structure has been operated to allow ingress of juvenile shrimp and crabs since 1962. The FEIS should note that operation of the control structure in this manner was not initiated until 1976."

Response: Paragraph (page I-7) has been modified to reflect this input.

Comment 6: "Page I-4 and I-5, paragraph (2) Maintenance - The fifth sentence, apparently addressing when maintenance dredging will take place, is not complete. The FEIS should also provide a description of the 1300 acres of bottom in Lake Arthur that will be used for spoil disposal."

Response: The entire paragraph has been deleted since the Mermentau River, Bayous Nezpique and Des Cannes project is no longer considered in the EIS.

Comment 7: "Page I-7 paragraph (d) Interrelationship and compatibility of projects - This paragraph notes that 'Improved agricultural drainage resulting from proposed and completed Soil Conservation Service and State of Louisiana projects will have the net cumulative effect of increasing water flows into the Lower Mermentau Basin and, at certain times of the year, increasing water levels in some areas.' Should this be the case, management for benefits to fishery resources would apparently be further hampered."

"The FEIS should thoroughly discuss how the net cumulative effect of increased water flows and increased water levels in the Lower Mermentau Basin will affect future operation of the water control structures."

Response: The proposed SCS projects will not change future operations of the water control structures.

Comment 8: "Page II-11, paragraph e Stages - The DEIS does not contain Appendix A referred to in this paragraph. The FEIS should include this referenced appendix."

Response: Summarized water quality data is included in Tables 2 - 4.

Comment 9: "Pages II-12 and II-13, paragraph (3) Water Quality Data - Tables 1, 2, and 3 referenced in this paragraph are not presented in the DEIS. The FEIS should contain the referenced tables."

Response: Tables 1, 2, and 3 have been added.

Comment 10: "Pages II-13 to II-18 (5) Description of Segments Values for sediment chemical oxygen demand (COD) presented on these pages should be standardized."

Response: Values for COD have been corrected.

Comment 11: "Page II-25 paragraphs (1) Stream-lake fishes and zooplankton and (2) Estuarine fishes and zooplankton - A more thorough discussion of aquatic animals in the project area should be presented in the FEIS. Gunter and Shell (1958) reported on the aquatic fauna inhabiting the Mermentau River Basin both before and after impoundment."

Response: These paragraphs (page II-28) have been expanded.

Comment 12: "Page II-26 paragraph (a) Commercial - A literature citation should be provided where specific data are presented. In addition, commercial fishery landings at area ports should be reported for a range of years up to and including 1978 data, since a report for one year may cover a record harvest or an unusually poor harvest. Values should also be denoted as being either ex-vessel or market price."

Response: The limited commercial fishery landing available are presented in paragraph 2.05 b(4)(a). All values are ex-vessel.

Comment 13: "Page II-26 paragraph (b) Sport fishing - This paragraph should be expanded to include a more detailed listing of recreationally important species."

Response: Paragraph 2.05 b (4)(b) has been expanded to include more detail.

Comment 14: "Page II-32, 2.09 Future environmental conditions of the project area without the proposed projects - This paragraph should note some of the beneficial impacts which would occur without the proposed projects. For instance, increased fishery production as a result of more accessibility by early life stages of living marine resources, reduced shoreline erosion in Grand and White Lakes as a result of overall lowered water levels during certain parts of the year, and a probable increase in exported detritus and nutrients from a presently impounded area."

"This paragraph attributes most of the adverse impacts named to the Mermentau River system proper and, except in a general way does not address impacts, either beneficial or adverse, which might occur in other areas within the projects' influence. In order to completely assess the future environmental conditions without the proposed projects, all identifiable impacts, both beneficial and adverse, should be discussed in the FEIS."

Response: The paragraph (page II-36) has been modified to address these concerns.

Comment 15: "Page IV-4 paragraph (a) General - This paragraph should note that approximately 1300 acres of water bottoms in Lake Arthur will be impacted as a result of spoil deposition as stated on page I-5, paragraph 1."

Response: The Mermentau River, Bayous Nezpique and Des Cannes project, containing Lake Arthur, has been deleted from the EIS.

Comment 16: "Page IV-5 paragraph (5) Aquatic resources - This paragraph states that 'maintenance of the lower Mermentau River between the gulf and the Catfish Point Control Structure will permit easier access by marine species to the marshes...' While this may be true for adults of some species, earlier life stages of most marine species depend on incoming tides for ingress into estuarine areas and as such do not require a maintained channel for entry. In fact, quite the opposite may be true since increased water velocities in a maintained channel could flush many early life stage organisms out of the estuary during times of flood water release. Also, the loss of shoreline marshes to deposition of dredged material further reduces available escape routes to these organisms during flood conditions."

Response: The paragraph (page IV-10) has been modified as suggested.

Comment 17: "Pages IV-6 and IV-7 paragraph (c) Mermentau River, Louisiana - The last sentence in this paragraph implies that the Schooner Bayou Control Structure was, or will be, operated to provide juvenile shrimp access to the basin. We are not aware of this having been the case, nor presently planned for the future. The FEIS should clarify this statement."

Response: The O&M Manual for operation of Schooner Bayou Control Structure has been amended in 1979 for fish and wildlife considerations. See paragraph 1.02(3)(e)e.

Comment 18: "Page IV-8 paragraph (c) Adverse impacts of water control structure operation - The FEIS should note that the present operational procedures are primarily responsible for blockage of the normal cycle of estuarine-dependent organisms. It should also be noted that under present operational procedures, seemingly little consideration is given to fishery resources. The control structures apparently are not operated for fishery resources during periods when maximum benefits would occur, if even the slightest adverse impacts would result on another use. Although Section 1 of the EIS does note the coordinated opening of Catfish Point Control Structure during periods of maximum organism abundance, this is more of a working agreement, used when possible, rather than an operational procedure."

Response: Present operating procedures for the Catfish Point and Schooner Bayou Water Control Structures provide for opening the structures in coordination with the Louisiana Department of Wildife and Fisheries' recommendations allowing for the ingress of juvenile marine organisms (shrimp, blue crabs, menhaden, and croakers) into the Mermentau estuary. The Operation and Maintenance Manual includes provisions implementing these coordinated openings of the water control structures.

Comment 19: "Page VI-2 paragraph (b) Proposed operations schedules for control structures - The FEIS should note that the NMFS, by letters of March 30, 1979 to FWS and July 19, 1977 to the New Orleans District (NOD), concurred with and supported the FWS Plan. The FEIS should also note that NMFS recommended another alternative (that of relocating the irrigation system in the vicinity of Schooner Bayou Control Structure to a more distant location) which would allow more flexibility in the operation of Schooner Bayou Control Structure."

Response: The concurrence of NMFS has been noted in paragraph 6.02b and the suggestion of NMFS on moving the irrigation system has been added as paragraph 6.02e. However, it must be noted that any proposed relocation of the rice irrigation systems should be reviewed by and have the concurrence of the rice industry and other affected agricultural interests.

Comment 20: "Page VI-3 paragraph (1) - The statement that operation of the control structure from July 1 to September 30 as suggested by FWS will reduce the amount of freshwater available for irrigation, seems to conflict with a later statement (page VI-5 paragraph 1) that a drawdown during this period will not seriously deplete irrigation water supplies in the Mermentau Basin. Also, the FEIS should discuss the factors that may require water levels outside the limits the FWS and NMFS recommended for the balance of the year. Approximate stages these other factors would require should be provided."

Response: The conflict between the two statements has been resolved. Stages inside and outside the Catfish Point Control Structure are discussed in the response to USDI comment 33.

Comment 21: "Page VI-4, first paragraph - The statement that operation of the Schooner Bayou Structure in a manner similar to the Catfish Point Structure would result in increased, adverse salinity levels in Schooner Bayou seems to be speculative. Establishment of a salinity monitoring program at Schooner Bayou Control Structure would accurately identify periods when the structure would or could not be operated in such a manner. Even limited operations similar to Catfish Point Structure, when salinities allow such operation, would be preferable to the present procedure and would result in increased benefits to fishery resources."

"Relocation of the irrigation intakes on Schooner Bayou to more distant locations, as suggested by NMFS letter to the NOD dated July 19, 1977, would further reduce salinity control problems."

Response: Schooner Bayou Control Structure is now operated to allow ingress of marine organisms. Relocation of the irrigation intakes is discussed in 6.02e.

Comment 22: "Page VI-4 paragraph (4) - The FEIS should clarify which survey study, the present one or the one referenced in this paragraph, is the optimum study for project modification and implementation. Due to the nearness of FY 80, if the present study cannot incorporate suggested project modifications in the FEIS, a timetable for study results should at least be formulated and presented in this FEIS."

Response: The studies referred to have not been funded. See paragraph (4) on page VI-7.

Comment 23: "Pages VI-5 and VI-6 paragraph c - The referenced letter from the Mayor of Crowley, Louisiana, seems to further support the contention that the Schooner Bayou Control Structure could be intermittently operated to allow ingress of marine organisms without seriously affecting the quality of rice irrigation water. The FEIS should more thoroughly discuss the points raised by Mr. Gielen; e.g., today most rice irrigation water is pumped from deep wells."

Response: The statement that most rice irrigation water is pumped from deep wells cannot be substantiated. The availability of good well water is declining. The water table is dropping and existing freshwater wells, especially those in the lower coastal area are becoming excessively saline due to saltwater intrusion. Even if most (more than 50 percent) of the rice irrigation water is now obtained by pumping from wells, the remaining (less than 50 percent) required demand may well exceed available supply or prove to be too costly.

Comment 24: "Pages VII-1 and VII-2 7.02 Water control structure - The discussion on these two pages seems to imply that all the procedures FWS suggested were implemented. We are not aware of this being the case. The FEIS should more clearly delineate which recommended procedures were implemented by the Corps. We also disagree that the long-term impacts of following the suggested FWS and NMFS recommended procedures would cause a loss of freshwater species in Grand and White Lakes and cause a reversion of fresh water marsh species to a more brackish marsh. While unregulated openings of the control structures would probably eventually lead to some spatial shifts by fishery species, a regulated and coordinated program of gate openings should not result in major species replacement of either fish or vegetation. The partial implementation of the FWS recommendations in 1976, primarily as regards the Catfish Point Control Structure, resulted in greatly increased marine fishery benefits without any identifiable adverse impacts to other uses of the lakes' systems."

Response: The paragraph (pages VII-1 and VII-2) has been corrected so it no longer implies all FWS suggestions were implemented.

(4) US DEPARTMENT OF AGRICULTURE, SOIL CONSERVATION SERVICE, STATE CONSERVATIONIST

Comment: "The following is offered as a correction and update to paragraph b, page I-7:

1. Seventh Ward Canal Watershed and Bayou Blue Watershed should be added to the watersheds mentioned.

2. A sentence should be added at the end of this paragraph as follows: Bayou Mallet and Bell City watersheds are in the active planning phase."

Response: The input from this comment has been added to the paragraph on page I-9.

(5) FEDERAL ENERGY REGULATORY COMMISSION, ADVISOR ON ENVIRONMENTAL QUALITY

Comment: "The Draft EIS has been reviewed by appropriate FERC staff components upon whose evaluation this response is based. The staff concentrates its review of other agenices' environmental impact statements basically on those areas of the electric power, natural gas, and oil pipeline industries for which the Commission has jurisdiction by law, or where staff has special expertise in evaluating environmental impacts involved with the proposed action. It does not appear that there would be any significant impacts in these areas of concern nor serious conflicts with this agency's responsibilities should this action be undertaken."

Response: Noted.

(6) DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT, ENVIRONMENTAL CLEARANCE OFFICER

Comment: "... it has been determined that the Department will not have comments on this statement."

Response: Noted.

b. State agencies

(1) DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT, OFFICE OF PUBLIC WORKS

Comment 1: "Section 4 of your document pertains to probable impacts of the proposed actions on the environment. In this section paragraph 4.03 indicates that upland dredged material sites will be diked and equipped with spill boxes and adjustable weirs. It would be appropriate that the draft statement only indicate various types of dredging activities without making a definite statement concerning which sections will be dredged in what manner."

Response: Paragraphs 4.03a(1), 4.03b, and 6.01c have been modified.

Comment 2: "The Office of Public Works has consistently objected to local interest being charged with furnishing the spoil disposal areas and constructing dikes, spill boxes, adjustable weirs, etc. In view of your current requirements we will no doubt, in most cases, require your office to develop plans for the utilization of bucket type equipment, except in large water bodies where spoil disposal sites may be remote to the channel improvement. Under Section 6 you list structural alterations and this item does include bucket dredging, casting and stacking under 6.01c."

Response: District policy directs that dredging will be accomplished by whatever method is least costly to the government. Should environmental considerations or desires of others require another method of dredging, the additional costs will be borne by local interests.

(2) LOUISIANA DEPARTMENT OF WILDLIFE AND FISHERIES

Comment 1: "We cannot support the above referenced projects in light of the data presented in the EIS describing the bottom sediments throughout the system. These data describing the COD and Hg concentrations are particularly disturbing even though we realize that the mg/g designation of concentration is a typographical error."

Response: Comparisons are made in FEIS Table 2 of bottom sediment chemical characteristics with EPA proposed guidelines for determining the acceptability of dredged sediments disposed in Region VI. These comparisons are made only for the determination of gross contaminant concentrations. It should be noted that the EPA proposed guidelines have never been promulgated into criteria since their transmittal by EPA to USAED-NO in 1973. Bulk sediment analysis has not proven useful for predicting either the chemical or biological impacts of dredged material disposal. The mere presence of a chemical constituent in dredged material does not imply that adverse environmental impacts would occur as a result of dredging and/or aquatic disposal of that sediment. The constituent may be present in a chemically immobile, or biologically unavailable form. The impact on aquatic organisms is related to the concentration of mobile or readily available sediment contaminants rather than the total concentration. Bulk sediment concentrations of contaminants are usually unrelated to their respective concentrations in the elutriate and other sediment extractions (Brannon et al. 1976, Lee et al. 1978, and Lee et al. 1975). Brannon et al. (in prep.) demonstrated that total chemical concentrations in sediments cannot predict long-term net releases of chemical constituents from sediments. Other results (Hirsch et al.) showed that total sediment analysis cannot predict uptake and accumulation of contaminants by various aquatic organisms. Lee and Plumb (1974) concluded that using sediment total chemical analysis to assess short- and long-term impacts of disposal is technically unsound and unlikely to result in any level of environmental protection. Results of the above studies conducted under the Dredged Material Research Program has consistently verified their conclusions. Mercury sediment concentrations in segments III, IV, VI, VII, and VIII are generally within the EPA proposed guidelines. Only one sediment sample on segment VI had a mercury concentration more than minimally above the EPA proposed guidelines. High COD in bottom sediments is not unusual in this part of Louisiana. Generally high levels of vegetational growth and biomass contribute large quantities of organic matter (detritus) to sediments. A substantial portion of bottom sediment COD is due to the materials recycling process in the natural system. The largest pool of oxidizable substances which would be expected to be present in sediments at the sample sites would be naturally occurring organic matter. This does not discount the possibility that anthropogenic sources may be responsible for COD levels.

Comment 2: "We consider portions of the proposed projects to be unconscionable given the probable effects upon fisheries and human health by the introduction of toxins into the food chains and high oxygen demanding materials into the waters, particularly since fisheries, human health and the economy were severely impacted by the cholera outbreak in 1978. Although the cholera problem was localized in 1978, the seafood industry of the entire state were adversely affected. We wish to avoid any future recurrence of this type of problem."

Response: The standard elutriate mixture for sample locations on segments III, IV, VI, and VII (see Tables A-15 to A-40) showed COD elutriate values to range from 22.0 mg/l to 106 mg/l. The average of the elutriate CODs measured was 49.3 mg/l. In the majority of cases, elutriate COD values were not substantially greater than ambient surface water COD values. EPA criteria have not been promulgated for COD presence in either the dissolved or total fractions of ambient water; therefore, the elutriate COD values cannot be compared with criteria. A review of water quality data from the EPA Storet system for 119 samples on segments III, IV, VI, and VII for a 3½-year period from January 1976 to October 1979 indicates an average COD value of 59.8 mg/l. This would represent the total fraction COD for natural water conditions. Dissolved fraction COD composes the majority of COD in segments III, IV, and VI. With the exception of some sites in segment VII, the COD of the elutriate does not greatly exceed the dissolved fraction COD of ambient water.

EPA criteria (Quality Criteria for Water, USEPA, 1976) specify a level of 0.05 ug/l as the maximum allowable mercury concentration for the protection of freshwater aquatic life, and 0.10 ug/l as the maximum allowable mercury concentration for the protection of marine aquatic life. The fact that some elutriate data indicate levels of mercury which exceed the EPA criteria does not necessarily imply that harm would be done to aquatic organisms. Comparison of elutriate test and field results has indicated that the elutriate test is environmentally conservative, tending to overestimate the magnitude of contaminant release observed in the field (Lee et al. 1978). The elutriate test projects an environmental safety margin when considering the protection of water quality and marine organisms. Furthermore, the EPA criteria to which the elutriate data are compared are conceptually intended to protect aquatic organisms from continuous exposure to biologically available forms of contaminants for a significant portion of their lifetime. The chronic exposure criteria ("Quality Criteria for Water", USEPA, 1976) specify concentrations of chemical constituents which, if maintained indefinitely, would not impair the propagation of fish and other aquatic life. The 0.05 ug/l freshwater and 0.10 ug/l marine criteria are therefore maximum allowable chronic exposure levels. This creates evaluational problems because the disposal operations would be intermittant and would not result in chronic exposure situations. At the present time, valid water quality criteria for the short-term exposures usually encountered during disposal operation may not generally be

available. Decreasing the time of exposure to toxic chemicals significantly raises the level of tolerance. Concentrations considerably greater than those specified in the chronic exposure criteria can be allowed for short periods of time without having a significant adverse effect on water quality or biota at the disposal site. Before an adverse impact to an organism at the disposal site would occur, the exposure time and chemical concentration must exceed the time of exposure - critical concentration relationship for the respective organism - chemical combination.

Subsequent to publication of the DEIS, the USEPA promulgated water quality criteria intended to replace those found in the 1976 "Quality Criteria for Water". The criteria for mercury are presented as follows:

Freshwater Aquatic Life

0.20 ug/l as 24 hour average
4.1 ug/l at any time
(total recoverable mercury)

Saltwater Aquatic Life (includes estuarine species)

0.10 ug/l as 24 hour average
3.7 ug/l at any time
(total recoverable mercury)

Human Health

0.146 ng/l
(Protection of human health from the toxic properties of mercury ingested through contaminated aquatic organisms alone - includes freshwater, estuarine, and marine species)
0.144 ng/l
(Protection of human health from the toxic properties of mercury ingested through water and contaminated aquatic organisms)

The two number criterion for aquatic life protection is intended to identify an average pollutant concentration which will produce a water quality generally suited to the maintenance of aquatic life and its uses while restricting the extent and duration of excursions over the average so that that total exposure will not cause unacceptable adverse effects. The human health criteria is based on protection of human health from the toxic properties of mercury ingested through contaminated aquatic organisms alone.

Comparison with the EPA criteria for the mercury levels for those segments where hydraulic dredging would occur indicates the following. For segment VI, only one value for ambient water and no elutriate values were above the chronic EPA criteria. For segment VII, only two out of eight sites showed mercury detected in the water column. Mercury was not detected in standard elutriate or ambient water in segment VIII. It is noted that none

of the standard elutriate values in segments VI, VII, or VIII exceed the EPA human health criteria, based on protection of human health from the toxic properties of mercury ingested through aquatic organisms. All elutriate values from segments VI, VII, and VIII are below the EPA human health criteria. Furthermore, diked disposal areas, where used, would help to limit any release of mercury into the ambient waters. Maintenance operations on segments III and IV would consist of clearing and snagging operations only. These activities would be expected to have a substantially lower impact on constituent releases than would hydraulic dredging.

Comment 3: "However, the presence of mercury in the sediments and the possibility of its introduction into seafood organisms increases the potential for a new round of national exposure."

Response: The long-term impacts of mercury contamination, including bioaccumulation and food chain transfer to higher trophic levels may be more important than the short-term effects. The long-term impacts are also more difficult to assess. The predominant form of mercury in freshwater, and probably in marine water as well, is Hg++ which is present as chelates and complexes with a variety of inorganic and organic ligands. This does not exclude the possibility of the presence of other mercury forms, especially in contaminated areas. Methyl mercury may be present in the project area due to biomethylation of inorganic mercury in the sediments. Because mercury has a strong affinity for sulfur, and in natural waters with anoxic bottom sediments hydrogen sulfide is most likely available, mercury is probably also present firmly bound to the project segments as insoluble mercuric sulfide (HgS). HgS formation in anaerobic aquatic environments may limit the amount of mercury available for methylation reactions. If waters with reducing conditions became aerobic through mechnical aeration (dredging), the insoluble mercury could be released in the ionic form which would be available for microbial methylation. In an oxygenated water column, it would be expected that the released ionic mercury would adsorb onto the suspended particulates. Mercury adsorbed onto suspended particulates is generally believed to be less bio-available than dissolved mercury. The standard elutriate data for segments VI, VII, and VIII show levels of mercury which do not greatly exceed the ambient water dissolved levels and which are often less than ambient water dissolved levels. Incremental increases in mercury bioaccumulation effects would not be expected from the dissolved phase. However, the mercury, not being dissolved, remains strongly associated with the sediments or the particulate phase, which settles either immediately or may be transported, and can fan out or settle at more distant locations. It would have to be assumed that any resuspension of mercury laden sediments would result in at least some mercury being made available to the aquatic ecosystem which otherwise would not have been. High rates of methylation in the aquatic environment occur where

conditions are most favorable for bacterial growth. These areas are in the uppermost part of organic sediments and in the suspended organic material in the water. Those microorganisms able to methylate mercury at high rates are also usually resistant to the toxic effect of Hg++. There is some evidence that fish may have internal mechanisms for mercury methylation. Although correlations have not been firmly established between methylation rates and total mercury present in sediments, some data have shown methyl mercury to compose less than 10% of the total mercury. In the project area, high levels of organic matter, favorable pH and nutrient levels, and high temperatures may increase this percentage. While little is known about the processes of mercury transformations in sediments and suspended particulates, conditions at the project location would seem to be favorable for methylation. The degree to which methylation is actually occurring is, however, unknown. Bioaccumulation in aquatic species is related to the concentration of mercury present in sediments and surface waters, the rate of metabolic activity (which may be high in high temperature waters), and a host of other factors specific to species, location, and individual organism. Test organisms exposed to sediments from the Gulf Approach Channel showed statistically significantly higher mercury levels than organisms exposed to reference sediments. This would lead to the conclusion that some bioaccumulation of mercury would occur as a result of implementation of this project. The mercury levels observed were all well within FDA guidelines, however. Bottom sediment data (Table A-3) show that the other project locations under consideration had higher levels of mercury contamination than did the Gulf Approach Channel. Thus, there is a distinct possibility that project maintenance could affect the bioaccumulation potential. The exact degree to which additional mercury would be biomethylated, accumulated, and transferred up the food chain to higher trophic levels is unknown, unfortunately, and must remain somewhat a matter of conjecture.

Comment 3: "We find the Lake Arthur portion of the project particularly objectionable. Lake Arthur is extensively utilized by sport and commercial fishermen. Chemically reduced materials in the sediments plus other chemical oxygen demanding and biochemical oxygen demanding substances will cause severe oxygen depletion in Lake Arthur, particularly since spoil is proposed to be placed on the lake bottom. The result will be direct fish mortalities and possible contamination of survivors. Contaminants within the bodies of the dead fish will be translated and concentrated further up the food chains via scavenging terrestrial species and birds while concomittantly increasing the chance for a botulism outbreak."

Response: The Mermentau River, Bayous Nezpique and Des Cannes project, containing the Lake Arthur segment, has been removed from the EIS (see Change Sheet).

Comment 4: "Fisheries losses by direct mortality caused by the project construction must be compensated for by reimbursement to the state at the current species and size range monetary values. Monies for that purpose should be made an integral part of the project costs and thus a factor in any benefit/cost ratio. We did not find this problem addressed in the EIS."

Response: Documents authorizing the projects (Section 1.03) state that the US Government will be held free of any claims for liability with regards to maintenance of these projects.

Comment 5: "The statement does address possible adverse economic impacts on agriculture and the petroleum industry if the no action alternative is chosen, and states that increases in commercial fisheries would only partially compensate for losses in other areas.

The inverse of the situation is not addressed with equal emphasis in the document with the exception of shrimp and crabs."

Response: The section on No Action, now 6.02a, includes a discussion of the biological impacts of cessation of operation and maintenance of project features.

Comment 6: "It is our opinion that interrelated projects further up the watershed are not adequately addressed, particularly since they play a major role in the flooding problems in the project area. If this project is designed for flood control, at least in part, it follows that the origin of these flooded waters, and their nature, should be addressed."

Response: Flood control projects further up the watershed, under the direction of the Soil Conservation Service, are discussed in Section 1.04b. These projects will tend to channel flood waters into project waterways which must be maintained to alleviate downstream flooding and destruction.

Comment 7: "We do not concur with the statement on page IV-3 that 'clearing and snagging will not interfere with wildlife resources on a permanent scale...' Snagging destroys fish habitat by removing protective cover and spawning areas. Snagging also removes substrate upon which fish food organisms grow and feed. The resultant is overall reduction in the carrying capacity of a stream segment. That means a permanent or relatively permanent reduction in fisheries production. Clearing or the removal of overhanging vegetation drastically changes the nature of the riparian lands and changes the characteristics of the stream by increasing insolation. We know that nothing is permanent in geologic time, but there are degrees of permanence. Therefore, there are degrees of permanence attached to the effects on fish and wildlife associated with these projects."

Response: It is felt that clearing and snagging have only a minor impact on wildlife. The adverse impacts mentioned in this comment have been added to the section on Aquatic Resources, 4.02b(5).

Comment 8: "It is the position of this agency that the projects will lower the overall diversity and productivity of the Mermentau system and contributaries to a degree that will not be beneficial to fish and wildlife resources or to those who utilize these resources. We also feel that, as a result of these projects, unacceptable materials will be introduced into a series of food chains which will be contrary to the best long-term interests of the human population."

Response: It has been noted in several paragraphs in the discussion of adverse impacts (4.02b) that operation and maintenance of this project will lower the diversity and productivity of the Mermentau system.

Comment 9: "Productive marshlands will be lost by conversion of land area to water bottoms as a result of maintaining higher water levels in the marsh."

Response: This impact is acknowledged in paragraph 4.02c.

Comment 10: "Natural water fluctuations which have been instrumental in maintaining desirable vegetative food and cover for marsh animals will be destroyed; i.e., millet and other annuals will be lost, reducing the carrying capacity of the area for waterfowl."

Response: The impact on waterfowl is acknowledged in paragraph 4.02c.

Comment 11: "There will be increased flooding in the lower portions of the basin from more rapid runoff from the upper basin. Flooding presently seems to be a problem due to the 'new cut' recently completed at the mouth of the Mermentau. This cut which shortened the distance that boat traffic must travel down the Mermentau to the Gulf has been implicated by area residents in the recent flooding and destruction caused by tropical storm Claudette."

Response: This EIS does not cover the impacts of the 'new cut'; those were covered in an EIS on Mermentau River-Gulf of Mexico Navigation, Louisiana. It was filed with the Environmental Protection Agency in September, 1978.

Comment 12: "There will be a loss of potential spawning habitat for the anadromous striped bass. The Louisiana Department of Wildlife and Fisheries has stocked 198,991 stripers in the Mermentau since 1972 as part of the state's anadromous fish program.

The critical time for striped bass egg hatching after spawning in fresh water is 3 days in suspension. Cutting off bends and speeding up water flow by snagging and dredging may infringe upon this critical time frame and lessen the chances of successful hatching of the eggs."

Response: No bends will be cut off in the operation and maintenance project. The impact that snagging may have on striped bass is discussed in paragraph 4.02b(5).

Comment 13: "Page I-7, item b. There are additional Soil Conservation Service watershed projects in the Mermentau Basin that should be reviewed."

Response: The additional SCS projects have been incorporated into the paragraph on page I-9.

Comment 14: "Page I-7, item d. The impacts of Soil Conservation Service projects are only mentioned. The impacts and damages to the basin should be further investigated in this statement."

Response: The purpose of this EIS is only to discuss the impacts of the operation and maintenance of four Corps of Engineers' projects. The above referenced SCS projects have been or will be covered in EISs prepared by that agency.

Comment 15: "Page II-22 (3) *Game Birds*. List blue-winged teal as resident?"

Response: The blue-winged teal has been deleted as a resident; however, as you well know, there are some populations of resident blue-winged teal in southwestern Louisiana.

Comment 16: "Page II-24. Species protected under the Marine Mammal Act should be reviewed."

Response: Paragraph 2.05b(4)(e) now mentions such species.

Comment 17: "Page II-25. (86.1) Stream-lake fishes and zooplankton. Should mention that though fishes above the structures are mostly freshwater species, saltwater species are present.

1. Morton, T. 1973. The ecological effects of water control structures on an estuarine area, White Lake, Louisiana, 1972-1973. M.S. Thesis, University of Southwestern Louisiana.

2. Perry, W.G. 1978. Distrubution of fish in the Rockefeller-Grand Lake tidal bayou complex, southwest Louisiana. Proc. Louisiana Acad. Sci. XLI: 101-114.

3. Perry, G. Seasonal occurrence of fishes in Grand Lake and White Lake, Louisiana, 1977-1979. (in preparation)

The classic study of the fishes before this development in the basin by Gunter (Gunter, G., and W.E. Shell. 1958. A study of an estuarine area with water level control in the Louisiana marsh. Proc. Louisiana Acad. Sci. 21:5-34) revealed that, both in numbers and species, marine and estuarine organisms dominated."

Response: Paragraphs 2.05b(1) and (2) have been modified to include the above information.

Comment 18: "Page II-26. (4,6) Sport Fishing. The Louisiana Department of Wildlife and Fisheries has released 198,991 of the anadromous striped bass in the Mermentau River systems since 1972. This should prove to be an additional species available to sports fishermen."

Response: This information has been added to paragraph 2.05b(4)(b).

Comment 19: "Page II-26 (4,e). Endangered and/or Threatened. The EIS does not mention Atlantic sturgeon, Acipenser oxyrhynchus. A specimen of Atlantic sturgeon was caught by Mr. Hugh Mhire in an otter trawl while shrimping in the Gulf off the mouth of the Mermentau River."

Response: The Atlantic sturgeon is neither threatened nor endangered, according to the USDI Region 4 listing of rare and endangered species. The species is listed in the American Fisheries Society listing [Fisheries 4(2):29-44 (1979)] as threatened.

Comment 20: "Page II-28 (2,b) Status of Cultural Resource Survey. Another ground survey of the lower Mermentau will probably reveal some interesting sites. Mr. Paul Coreill, Marine Extension Agent, Cameron, Louisiana, has indicated knowledge of several sites in the area."

Response: Noted.

Comment 21: "Page III-1 (3.02) Conflicts of proposed action with existing or proposed land use plans. 'Areas may possibly be reclaimed and used for agricultural and/or industrial use.' This action would conflict with fish and wildlife resource development and enhancement."

Response: The project area is principally marsh/wetland or agricultural; thus, little development is expected. In addition, subsidence would hinder construction and/or developmental projects.

Comment 22: "Page IV-1. 4.01 (6) Saltwater barrier operation. Beside removing the areas from estuarine productivity, changing salinity regimens will serve to encourage aquatic weed problems which our state is already spending millions on. Presently saltwater periodically enters this system, killing back much of this growth."

Response: We must point out that these structures have been operating for years and that present operational procedures permit saltwater to periodically enter the system especially during non-rice growing periods, thus reducing aquatic weed growth cover and potential.

Comment 23: "Page VI-3. Item C. Although the present operation of the structure has resulted in some benefits to fishery resources, there is still room for improvement."

Response: Continued close cooperation and coordination between the New Orleans District and biologists of the Louisiana Department of Wildlife and Fisheries with regard to opening periodically these water control structures will ensure a minimum of damage to the fishery resources of the lower Mermentau Basin.

Comment 24: "Page VII-2 (7.02) Water Control Structures. 'The long term impact... be loss of freshwater species ....' Experience gained through field sampling leads us to believe that salinities the system will be subjected to will not be as harmful as stated."

Response: This paragraph now acknowledges loss of some freshwater vegetation; however, the marshes will remain generally fresh.

Comment 25: "Plates. The disposal areas illustrated in the plates indicate that some extremely productive water bottoms will be destroyed for fisheries."

Response: It is acknowledged that project construction will have a detrimental effect on the fishery resources of the lower Mermentau Basin.

(3) DEPARTMENT OF CULTURE, RECREATION AND TOURISM, OFFICE OF PROGRAM DEVELOPMENT

Comment: "In reviewing the cultural resources sections of the report referenced above, and the cultural resources survey reports of the component parts of the Mermentau River basin work, we were unable to locate passages in the report which specifically identify sites as eligible or ineligible for inclusion in the National Register of Historic Places. My staff has consulted with the cultural resources section of the New Orleans District, but they have not been able to locate this information so far. It appears that no effect to cultural resources in the Bayou Plaquemine Brule and Bayou Queue de Tortue project areas will occur, and since cultural resources surveys of the Mermentau River, Louisiana, project are forthcoming, our concern is with the Mermentau River, Bayous Nezpique and Des Cannes. Our copy of the survey report of the latter project does not contain Appendix II. It may be that this Appendix provides the information we need."

Response: As stated on page II-28 of the draft EIS, the cultural resources survey of the Mermentau River, Bayous Nezpique and Des Canne, LA, project located no cultural resources in project areas listed on or eligible for inclusion on the National Register of Historic Places. It should be noted that the Mermentau River, Bayous Nezpique and Des Cannes, LA, project has been deleted from the final EIS, for consideration at a later date. The Appendix II mentioned in the survey report was listed inadvertently during typing of the report and should be deleted from any copies you may have.

(4) STATE OF LOUISIANA, DEPARTMENT OF NATURAL RESOURCES, OFFICE OF FORESTRY

Comment 1: "Except for one statement under Section 2.04, BOTANICAL ELEMENTS, item h., concerning merchantable bottomland hardwoods and the understocked nature of the stands, the entire matter of the forested character of the specific project area has been treated, or discussed, too casually and inadequately in my opinion."

"There is considerable discussion of vegetation communities and forests in the aforementioned section 2.04 under items a., b., d., and f., but these references are to the general area of the Mermentau basin and floodplain, and not to the specific 4,300 acres in question."

Response: With deletion of the Mermentau River, Bayous Nezpique and Des Cannes portion of the project, no forested disposal areas remain.

Comment 2: "Since this area was previously used as a disposal site for dredged material, it is quite possible that no merchantable timber exists. I would, however, have to automatically question the statement made in Section 2.04 h., that '...only undersized, second growth trees are left in insufficient quantities to make harvesting practical,' unless you care to cite the specifics of the field cruise made to confirm this, and the source of your expert information."

"If, in fact, there is a sufficient quantity of merchantable material available, every effort should be made to dispose of this by commercial sale to the highest bidder prior to the beginning of spoil deposition. If no sale can be effected due to low volumes or severe logging conditions, the material should be given away, if possible, rather than be destroyed by spoil and thus completely wasted."

Response: Field trips and review of aerial photographs (color infra red) and consultations with other District personnel indicate that the statement is generally accurate as indicated.

District personnel familiar with dredging contracts indicated that the contractor was free to dispose of merchantable material either through bidding or letting the landowners harvest their materials. If neither of these alternatives were feasible, the land would be cleared and the vegetation burned.

Comment 3: "Finally, it is my opinion, in the case of recolonization, mentioned under Section 4.02b, (2), page IV-3, and Section 5.02, page V-1, that these areas will in fact not recolonize with upland species in any reasonable length of time, and certainly not within 2-5 years. More likely, recolonization will be accomplished first with

typical pioneer species such as willow and Chinese tallow; and any succession to true upland species, or better quality hardwoods, will be some considerable years into the future."

"Assuming the concerns expressed herein are properly addressed and reevaluated, I would have no further comments on or objections to the project as outlined."

Response: We apparently have a semantic difficulty. The "upland" species we refer to in sections 4.02b (2) and 5.02 include willow and Chinese tallow tree and are so indicated now. We are using the term upland in the sense of non-marsh ridge vegetation.

c. ENVIRONMENTAL DEFENSE FUND

Comment 1: "We have several general concerns which are typical of these kinds of dredging operations. First, the impact statement indicates that at least 1800 acres of wetlands will be used as disposal sites for dredged spoils. As we have repeatedly urged the New Orleans District, in view of the extensive research which has been done under the Dredged Material Research Program at the Waterways Experiment Station, US Army Corps of Engineers, regarding alternative techniques for disposing of dredge spoils, we believe that feasible alternatives do exist to these kinds of destructive disposal methods."

Response: As stated in the draft document, maintenance of the projects is going to be highly infrequent with dredging required at sites that cannot be predetermined, thus, we cannot develop detailed plans for dredged material disposal at this time.

Comment 2: "The New Orleans District should contact that program to investigate alternative ways of disposing of these dredge spoils to avoid any adverse impact to wetlands and to utilize techniques to assure creative utilization of these so-called spoils. The typical disposal operation not only directly destroys wetlands but creates linear barriers to the natural flows of water, sediment and nutrients in the coastal zone. Other than lack of will, there is no excuse for continuation of this kind of operation. We think it would be appropriate for the Waterways Experiment Station, together with the New Orleans District, to put together a comprehensive management plan for disposal of dredge spoils for these four projects. Such a plan we would consider to be a reasonable necessary alternative."

Response: New Orleans District personnel are well aware of the valuable contributions made available from research carried on under the Dredged Material Research Program at the Waterways Experiment Station (WES). Contact is made with researchers at WES and their methodologies are being considered and applied in this District where practicable. Our own program of dredged material disposal attempts to maximize wetland creation and minimize wetland destruction and relies heavily on the site selection visits mentioned above. The program, plus information provided by WES, will, we believe, result in minimal disposal problems and water quality alterations in existing marsh communities along the Mermentau River projects.

Comment 3: "Furthermore, in comments on other environmental impacts, we have pointed out that this kind of channelization and loss of wetlands has severe secondary land loss impacts. Furthermore, the loss of wetlands typically contributes to degradation of water quality since the natural system which is capable of recycling nutrients and other pollutants is diminished. Water quality throughout much of

coastal Louisiana is relatively polluted with high levels of nutrients. Many of these nutrients come from agricultural sources, and no existing programs, other than increasing costs of fertilizers, will effectively contribute to control of this non-point source of pollution. On the land loss question, we refer you to Cumulative Impact Studies in the Louisiana Coastal Zone..Euthrophication..Land Loss, edited by M.J. Craig and J.W. Day, Jr., Final Report to the Louisiana State Planning Office (June 30, 1977). This report estimates that in most drainage basins in coastal Louisiana indirect land loss is two and three times direct land loss due to construction and maintenance of channels. On-going studies of land loss in coastal Louisiana, we understand, suggests that land loss, which has been estimated to be in excess of 16.5 square miles per year, is substantially greater than that and accelerating."

Response: Other concerns expressed in your letter related to secondary land loss and degradation of water quality. While your views on those aspects are appreciated, we are considering here operation and maintenance only on our existing project. While some of the adverse impacts may be reduced by operation and maintenance procedures, the opportunitities appear limited. Loss of land(s) in Louisiana is due to numerous factors; among those is erosion due to vessel traffic. During maintenance dredging, the process of "channel training" may be utilized to prevent, or greatly reduce, land loss during this project.

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SECTION XI

LETTERS RECEIVED BY THE DISTRICT ENGINEER ON THE DRAFT ENVIRONMENTAL STATEMENT

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United States Department of the Interior
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ER-79/737

OCT 10 1979

Colonel, Thomas A. Sands
District Engineer
U.S. Army Corps of Engineers
Post Office Box 60267
New Orleans, Louisiana 70160

Dear Colonel Sands:

We have reviewed the composite draft environmental statement for four projects in the Mermentau Basin, Mermentau River project; Mermentau River, Bayous Nezpique and Des Cannes; Bayou Plaquemine Brule'; and Bayou Queue de Tortue, Louisiana, as requested. We offer the following comments.

General Comments

We find that the statement should be revised and expanded in several areas in its discussion of fish and wildlife resources, the human uses of those resources, and project associated impacts on fish and wildlife.

Specific Comments

PROJECT DESCRIPTIONS

Page I-1, paragraph 1.01 - We believe that the spoil banks on the west bank of the Freshwater Bayou Canal now represent the eastern boundary of the Mermentau Basin and suggest this boundary be reflected in this paragraph and in Plate I (Page II-2).

Page I-3, paragraph (3) - Based on our areas of expertise it is questionable as to whether losses are being minimized and distributed equitably to all interests concerned. The project is being operated to maximize agricultural water use and navigation, with only secondary attempts to minimize losses to estuarine fishes and wetland habitat. The present operational plan for the water control structures discussed in this paragraph is at variance with plans utilized from the time the project was completed until 1962. The authority to operate the project, as is done presently, should be documented in this section with special references to the Congressional legislation that originally authorized project construction.

XI-1

Page 1-4, paragraph (3)(b) - This paragraph should also indicate the stage which would require opening of the Schooner Bayou Control Structure to maintain minimum water levels in the lakes.

Page 1-4, paragraph (3)(c) - The maximum water levels that will be maintained by gate closure should be defined in this section. Here again, it appears that operation of the control gates is not providing optimum overall results, especially when one considers the adverse impact of higher water levels on marsh vegetation and associated wildlife values.

Page I-4, paragraph (3)(e) - This paragraph would be clarified if it showed that the operation of Catfish Point Control Structure to permit ingress of juvenile shrimp and crabs was recently implemented in 1976, at the request of the Fish and Wildlife Service (FWS), the National Marine Fisheries Service, and the Louisiana Department of Wildlife and Fisheries.

Page I-4, paragraph c (1) - This paragraph should be expanded to better describe the extent of work which has been completed on the Mermentau River and Bayou Nezpique and Des Cannes project.

Page I-7, paragraph (b) - The Cameron Creole Watershed project, being planned by the Soil Conservation Service, adjoins the western boundary of the Mermentau Basin. Present plans call for diversion of excess fresh water from the Mermentau Basin into the East Cove Marsh area just east of Calcasieu Lake to reduce salt water intrusion and increase wetland productivity. The interrelationship between this project and the Mermentau River project should be briefly discussed in this section.

ENVIRONMENTAL SETTING WITHOUT THE PROJECT

Page II-1, paragraph 2.01 - As we stated above we believe that the eastern boundary of the basin includes the area up to the spoil banks on the west bank of the Freshwater Bayou Canal.

Page II-11, paragraph e - Appendix A is referenced but not included in the statement. If this is not to be included we suggest that hydrological data for the basin be summarized and included in the body of the statement to aid the reader in understanding this aspect of the project.

Page II-20, paragraph d - It should be pointed out that bottom-land forest and wooded swamp habitats also occur along Bayou Plaquemine Brule.

Page II-20, paragraph e - This section should be expanded to briefly describe the role of marshes, wooded swamps, and seasonally flooded bottom-land hardwood forests in fish and crawfish production, export of organic detritus, and maintenance of water quality. In addition, the source(s) of information used to describe the vegetation of the project

area should be provided. Two sources not cited which contain much valuable information on the vegetation of the area include:

Montz, G. N. 1977. A Vegetative Study of the White Lake and Vermilion Bay, Louisiana, Area. U.S. Army Corps of Engineers, New Orleans District, Regulatory Functions Branch, New Orleans, Louisiana. 28 pp.

Valentine, J. M., Jr. 1977. Plant Succession After Saw-grass Mortality in Southwestern Louisiana. Proceedings of the Southeastern Association of Game and Fish Commissioners 30:634-640.

Both Montz (referenced above) and Chabreck[1] reported that saltmeadow cordgrass (wiregrass) was abundant in the fresh marshes of the lower basin.

Page II-21, paragraph g - Observations by FWS biologists have shown that bladderworts (Utricularia spp.), Nitella (Nitella gracilis), and white water lily (Nymphaea odorata) are also common in the fresh marshes of the area.

Page II-22, paragraph 3 - The fulvous whistling duck is a common nester in the rice fields of the basin, and uses the marsh as resting and feeding habitat. Purple gallinules also nest in the fresh marshes of the area, especially in Lacassine Pool of Lacassine National Wildlife Refuge. The magnitude of the waterfowl use of the basin cannot be overemphasized. Waterfowl biologists from our FWS have estimated that peak populations of 750,000 to 1 million ducks, 125,000 lesser snow geese, and 22,000 white-fronted geese winter in the Mermentau Basin.

Page II-23, paragraph 4 - This paragraph should be revised to include a discussion of the seabird and wading bird colonies located in the project area. These were documented in a recent study conducted for our FWS[2], and are listed as follows:

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1. Chabreck, R. H. 1972. Vegetation, Water and Soil Characteristics of the Louisiana Coastal Region. Louisiana State University, Agricultural Experiment Station, Baton Rouge. Bulletin No. 664. 772 pp.

2. Louisiana Cooperative Wildlife Research Unit. 1977. Colonial Sea and Wading Bird Survey, Final Report. U.S. Fish and Wildlife Service Contract Number: 14-16-0008-1187.

Colony No.	Latitude	Longitude	Species
158004	29° 46'	92° 56'	great egret, olivaceous cormorant, roseate spoonbill, snowy egret
158005	29° 47	92° 54'	Louisiana heron, snowy egret
158006	29° 56'	92° 53'	anhinga, black-crowned night heron, great egret, olivaceous cormorant, great blue heron
158007	29° 59'	92° 52'	anhinga, black-crowned night heron, cattle egret, Forester's tern, great blue herom, great egret, little blue heron, Louisiana heron, olivaceous cormorant, roseate spoonbill, snowy egret, white-faced ibis, white ibis
158008	20° 53'	92° 35'	anhinga, black-crowned night heron, cattle egret, great blue heron, great egret, little blue heron, Louisiana heron, olivaceous cormorant, roseate spoonbill, snowy egret, white ibis
158009	29° 41'	92° 12'	black skimmer, least tern
158014	29° 44'	93° 01'	least tern

Page II-24, paragraph 8 - The monetary importance of recent alligator harvests in the study area is substantial and should be briefly discussed in this section.

Page II-25, paragraph b (1) - Other commercial fishes occuring in the lakes and streams of the project area include flathead catfish, yellow bullhead, smallmouth buffalo, and carp. The major freshwater sportfishes of the area were not mentioned in this paragraph. These include largemouth bass, white crappie, black crappie, bluegill, reader sunfish, and warmouth. Many of these species are abundant in the canals that occur in the marshes of the project area.

Page II-25, paragraph b (2) - The discussion of the estuarine fishery resources of the project area is not complete. Information derived from samples and catch records should be used to document the occurrence,

relative abundance, and harvest of the more common estuarine fishes and shellfishes. A comparison of preproject and post-project conditions is contained in the April 21, 1976, special followup report prepared by our FWS. Additional information can be obtained from the Louisiana Department of Wildlife and Fisheries and the following publications:

Morton, T. 1973. The Ecological Effects of Water Control Structures on an Estuarine Area, White Lake, Louisiana, 1972-1973. M. S. Thesis, University of Southwestern Louisiana.

Gunter, G., and W. E. Shell. 1958. A Study of an Estuarine Area with Water Level Control in the Louisiana Marsh. Proceedings of the Louisiana Academy of Science 21:5-34.

A full discussion of the projects effects on estuarine fishery resources should be added to this section.

Page II-25, paragraph b (3) - Crawfish are considered to be more typically residents of fresh marshes, ricefields, and wooded swamps, and not the lakes of the project area. The harvest of blue crabs in the project area should also be discussed.

Page II-26, paragraph (4)(a) - The harvest of freshwater and estuarine commercial fishes and shellfishes from the Mermentau Basin should be estimated by species or major species group. For estuarine/marine species, the data should be segregated between inshore harvest and related offshore production. Data should be presented for the last 5 years, which incidentally would show the benefits of the recent change in the operation of the Catfish Point Control Structure.

Page II-26, paragraph (4)(b) - Other important saltwater sportfishes not included in this section are red drum, black drum, Atlantic croaker, and southern flounder. Ponds and borrow areas are not considered significant sport fishing areas in the Mermentau Basin. Most of the sport effort is associated with Lacassine Pool at Lacassine National Wildlife Refuge, the numerous marsh lakes bordering Grand Lake and White Lake, the Big Burn marsh north of Little Cheniere, Lake Arthur, and the larger unchannelized stream segments in the area, including the Mermentau River.

Page II-27, paragraph (b) - We recommend that the final statement contain the results of the proposed cultural survey. In addition, the final statement should include the comments of the State Historic Preservation Officer and the Advisory Council on Historic Preservation concerning the project's impacts on cultural resources and proposed mitigation measures.

Page II-32, paragraph 2.09 - For comparison purposes this section should also discuss the impacts of the return of the Grand Lake/White Lake area to estuarine conditions. In addition, the fishery productivity of the

streams presently being channelized should be compared to the productivity of those streams, had the projects not been implemented or maintained.

RELATIONSHIPS OF THE PROPOSED ACTION TO LAND USE PLANS

Page III-1 - This section should be expanded to discuss the impacts of the present water level management practices followed in the Grand Lake/White Lake area on the productivity of the unimpounded portions of Lacassine National Wildlife Refuge. Prior research on Lacassine Refuge has demonstrated poor production of important waterfowl food plants when Mermentau Basin water levels are held above 1.8 feet mean low gulf (m.l.g.) during the summer months. The impacts that maintaining summertime water levels of 2.0 feet m.l.g. or greater by operation of the water control structures of the Mermentau River project are having on the marshes of Lacassine National Wildlife Refuge should be discussed.

PROBABLE IMPACTS OF THE PROPOSED ACTIONS ON THE ENVIRONMENT

Page IV-2, paragraph (4)(b) - It is stated that the excavation of streams in the upper portions of the Mermentau Basin was necessary to enhance transport of commercial fishes. It should be pointed out that channelization causes a serious decline in fish production, and continued maintenance of the project area streams will serve to perpetuate this reduced productivity.

Page IV-3, paragraph b (3) - We do not agree with the statements in this section which indicate that wildlife impacts will necessarily be minimal at maintenance spoil sites. If maintenance is not required until 10 or more years after construction, plant succession may allow substantial recovery in wildlife values. Thus, maintenance spoil disposal following such vegetation recovery will have substantial adverse impacts.

Page IV-5, paragraph (c) - The statement anticipates, as secondary groundwater impacts, increased withdrawals with resultant water-level declines and saltwater encroachment. We suggest that the summary of probable indirect or secondary impacts should address, at least in a general manner, the possibility of increased land subsidence.

Page IV-6 (8)(c) - The last sentence in this paragraph should be corrected. The New Orleans District Corps of Engineers has not formally agreed to operate the Schooner Bayou Control Structure in the manner requested by our FWS.

Page IV-8, paragraph (13) - Degradation of aesthics may be considered severe where spoil disposal occurs near extensive campsite developments along the middle and upper Mermentau River. This impact should be recognized in the statement.

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Page IV-8, paragraph (13) - Degradation of aesthics may be considered severe where spoil disposal occurs near extensive campsite developments along the middle and upper Mermentau River. This impact should be recognized in the statement.

Page IV-8, paragraph (c) - It should be clearly pointed out that the project area marshes were not brackish and saline prior to construction of the water control structures at Catfish Point and Schooner Bayou, as is implied in this paragraph.

Page IV-9, paragraph b - This paragraph should state the acreage of lake bottom that would be affected by disposal of dredged material.

PROBABLE ADVERSE ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED

Page V-2, paragraph 5.06 - This paragraph should be modified to state that the high water levels maintained in the lower basin are partly responsible for the severe bank erosion along Grand and White Lakes.

ALTERNATIVES TO THE PROPOSED ACTION

Page VI-1, Structural Alternatives - The alternative of using agricultural land in lieu of wetland disposal sites, such as in the Lake Arthur reach, should be explored. Creation of wetland habitat in the Lake Arthur area with spoil should also be considered and adequately discussed.

Page VI-3, paragraph c (1) - A much more detailed explanation is needed regarding the infeasibility of implementing the drawdown recommended by the FWS. It is not clearly stated why the recommended drawdown cannot be included as an objective of the operational plan to be achieved to the extent allowable by prevailing tidal and runoff conditions. To simply state that the recommended drawdown ". . . will be impracticable on many occasions. . ." is not a justifiable reason for rejection of those recommendations. The feasibility of reducing stages to 1.8 feet m.l.g., instread of 1.5 to 1.8 feet m.l.g. as previously recommended by the FWS, should also be discussed. This elevation would presumably be easier to attain, and would still allow for germination of valuable waterfowl food plants in the 200,000 acres of fresh marsh affected by the project, including a major portion of Lacassine National Wildlife Refuge. This paragraph should also discuss in adequate detail the nature of the ". . . factors other than fish and wildlife considerations . . ." that might require water levels outside the 2.0 to 2.2 feet m.l.g. recommended by the FWS for the nondrawdown period.

Page VI-3, paragraph c (2) - It should be specified whether the coordinated operation of Catfish Point Control Structure in the manner requested by the FWS will be or has been written into the operational manual or other official instructions to be adhered to by Corps field personnel responsible for operation of that structure.

Page VI-4, paragraph (3) - We note the Corps decision not to participate in a committee recommended to periodically review and asses the operation of the Mermentau River project and formulate recommendations specifically

designed to preserve and enhance fish and wildlife resources. In view of the fact that the existing ongoing study of Mermentau, Calcasieu, and Vermilion Rivers, and Bayou Teche is examining the advisability of modifying the existing Mermentau River project, it would seem that such a committee would provide an excellent opportunity to suggest operational changes designed to improve environmental quality. This would be in keeping with the intent of the Fish and Wildlife Coordination Act that fish and wildlife shall receive equal consideration with other purposes of Federal water development projects.

Page VI-4, paragraph (4) - This paragraph indicates that the FWS recommended studies of project modifications designed to facilitate drawdown and permit easier ingress of post-larval and juvenile shrimp into Grand and White Lakes will be initiated in 1980. However, we have been advised that no such studies will be initiated in the foreseeable future. If this is the situation it would appear that a low priority has been placed on fish and wildlife aspects of the ongoing survey study. This is not in keeping with the requirement of the Fish and Wildlife Coordination Act that fish and wildlife be given equal consideration with other project features. This discrepancy should be clarified.

Page VI-4, paragraph (d) - This paragraph should clearly spell out that the benefits discussed are associated with implementation of the plan recommended by the FWS in its special followup report of April 21, 1976. Certain features of that plan have not been officially adopted by the Corps including operation of Schooner Bayou Control Structure to permit ingress of marine organisms and seasonal drawdowns for waterfowl food plant production. If the plan is not implemented the benefits will not occur. This should be recognized in the statement.

Page VI-7, paragraph 1 - The rationale used to reach the conclusion that silting up of project channels will reduce commercial fishing benefits is unclear, as Grand Lake and White Lake functioned as a low-salinity estuary prior to project construction. This should be clarified.

THE RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF MAN'S ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

Page VII-1, paragraph 7.01 - We do not agree with the statement that the project represents no loss of long-term productivity associated with renewable marsh resources; wetland associated wildlife productivity in the 1,800 acres of wetlands designated as disposal areas will be greatly reduced. Additionally, project operation is causing continued marsh deterioration as a result of increased water levels being maintained in the Grand Lake/White Lake area. This statements should be revised.

Page VII-1, paragraph 7.02 - The statement that the FWS-recommended changes in operational procedures for the water control structures at

Catfish Point and Schooner Bayou were implemented is only partially correct. As discussed previously, only the operation of Catfish Point Control Structure was altered to permit shrimp and crabs to enter these waters. The seasonal drawdowns and operation of Schooner Bayou Control Structure to permit marine organisms ingress were not accomplished through altered project operation. We do not agree with the long-term impact projection that the fresh marsh plant association will be converted to a more brackish marsh plant association. It is our opinion that water salinities will remain within the tolerances of fresh marsh species, since only small amounts of salt water would be introduced. This view is supported by paragraph c(2) on page VI-3 of this statement.

We appreciate the opportunity to comment on this statement.

Sincerely yours,

Raymond P. Churan

Raymond P. Churan
Regional Environmental Officer

XI-5

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION VI
1201 ELM STREET
DALLAS, TEXAS 75270

October 9, 1979

Colonel Thomas A. Sands
District Engineer
New Orleans District
U.S. Army Corps of Engineers
P.O. Box 60267
New Orleans, Louisiana 70160

Dear Colonel Sands:

We have completed our review of the Draft Environmental Impact Statement (EIS) prepared for the operation and maintenance of four existing projects in the Mermentau River Basin, southwestern Louisiana. These projects will continue to serve the multiple purposes of flood control, navigation, prevention of saltwater intrusion, and retention of freshwater for agricultural uses. The projects include (1) Mermentau River, Louisiana; (2) Mermentau River, Bayous Nezpique and Des Cannes, Louisiana; (3) Bayou Plaquemine Brule, Louisiana; and (4) Bayou Queue de Tortue, Louisiana.

The following comments are provided for your consideration in preparation of the Final Environmental Impact Statement.

1. Due to the absence of a Section 404(b)(1) evaluation within the Draft EIS, we assume that it is the intent of the Corps of Engineers not to seek a 404(r) exemption. We would appreciate it if the Final EIS would acknowledge the validity of this assumption.

2. The description of the proposed work provided in the Draft EIS is very general in nature. It would strengthen the Statement if the Final EIS would discuss in greater detail the volumes of dredge material to be excavated; the location and land use patterns of the disposal areas; and the acreages, types and the relative values of the wetland areas to be destroyed or adversely impacted. This information is necessary to allow thorough impact evaluation of the proposed project actions.

3. The Final EIS should discuss any adverse impacts the water control structures may impose upon the normal migration, spawning, and feeding habits of the fish and shellfish species affected. The impacts of the blockage of migration routes as well as fluctuations in water levels in channels and adjacent wetlands should also be discussed.

4. Additional information on the projected uses of the water stored by the water control structures should be addressed in the Final Statement. Specifically, the Final EIS should identify the acreages of cropland in the project vicinity, the acreages of cropland under irrigation, the approximate volume of water required, and the percentage of irrigation water taken from irrigation wells within the project study area. This information will assist in evaluating the stated project need and projected benefits.

5. Appendix A, which is referenced on page II-11, is not contained in the Draft EIS. This information should be included in the Final Statement.

These comments classify your Draft Environmental Impact Statement as ER-2. Specifically, we are expressing environmental reservations with the proposed project action with respect to the potential adverse impacts associated with placement of dredge material and are requesting additional information to more adequately assess the impacts to the wetlands. In addition, we are asking that information identifying impacts associated with the use of water control structures and the intended use of the water stored by these structures be adequately discussed in the Final EIS. Our classification will be published in the Federal Register in accordance with our responsibility to inform the public of our views on proposed Federal actions, under Section 309 of the Clean Air Act.

9-14

Definitions of the categories are provided on the enclosure. Our procedure is to categorize the EIS on both the environmental consequences of the proposed action and on the adequacy of the Impact Statement at the draft stage, whenever possible.

We appreciated the opportunity to review the Draft Environmental Impact Statement. Please send our office two copies of the Final Environmental Impact Statement at the same time it is sent to the Office of Environmental Review, U.S. Environmental Protection Agency, Washington, D.C.

Sincerely,

Francis E. Phillips for

Adlene Harrison
Regional Administrator (6A)

Enclosure

ENVIRONMENTAL IMPACT OF THE ACTION

LO - Lack of Objections

EPA has no objections to the proposed action as described in the draft impact statement; or suggests only minor changes in the proposed action.

ER - Environmental Reservations

EPA has reservations concerning the environmental effects of certain aspects of the proposed action. EPA believes that further study of suggested alternatives or modifications is required and has asked the originating Federal agency to re-assess these aspects.

EU - Environmentally Unsatisfactory

EPA believes that the proposed action is unsatisfactory because of its potentially harmful effect on the environment. Furthermore, the Agency believes that the potential safeguards which might be utilized may not adequately protect the environment from hazards arising from this action. The Agency recommends that alternatives to the action be analyzed further (including the possibility of no action at all).

ADEQUACY OF THE IMPACT STATEMENT

Category 1 - Adequate

The draft impact statement adequately sets forth the environmental impact of the proposed project or action as well as alternatives reasonably available to the project or action.

Category 2 - Insufficient Information

EPA believes the draft impact statement does not contain sufficient information to assess fully the environmental impact of the proposed project or action. However, from the information submitted, the Agency is able to make a preliminary determination of the impact on the environment. EPA has requested that the originator provide the information that was not included in the draft statement.

Category 3 - Inadequate

EPA believes that the draft impact statement does not adequately assess the environmental impact of the proposed project or action, or that the statement inadequately analyzes reasonably available alternatives. The Agency has requested more information and analysis concerning the potential environmental hazards and has asked that substantial revision be made to the impact statement. If a draft statement is assigned a Category 3, no rating will be made of the project or action, since a basis does not generally exist on which to make a determination.

PD-R

UNITED STATES DEPARTMENT OF COMMERCE
The Assistant Secretary for Science and Technology
Washington, D.C. 20230
(202) 377-4335

September 28, 1979

Colonel Thomas A. Sands
New Orleans District, Corps of Engineers
Department of the Army
Post Office Box 60267
New Orleans, Louisiana 70160

Dear Colonel Sands:

This is in reference to your draft environmental impact statement entitled, "Operations and Maintenance of Four Projects in the Mermentau Basin, Louisiana." The enclosed comments from the National Oceanic and Atmospheric Administration are forwarded for your consideration.

Thank you for giving us an opportunity to provide these comments, which we hope will be of assistance to you. We would appreciate receiving eight (8) copies of the final environmental impact statement.

Sincerely,

Sidney R. Galler
Deputy Assistant Secretary
for Environmental Affairs

Enclosure Memo from: Mr. William H. Stevenson
National Marine Fisheries Service

XI-7

Rec'd PP/EC
SEP 19 1979

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Duval Building
9450 Koger Boulevard
St. Petersburg, FL 33702

September 14, 1979 FSE61:DM
893-3503

TO: EC - Dr. Richard L. Lehman

FROM: FSE - William H. Stevenson

SUBJECT: Comments on Draft Environmental Impact Statement (Composite Environmental Statement for Operation and Maintenance of Four Projects in the Mermentau Basin, Louisiana) (COE) (DEIS #7907.66)

The subject draft environmental impact statement that accompanied your memorandum of August 1, 1979 has been received by the National Marine Fisheries Service for review and comment. The statement has been reviewed and the following comments are offered for your consideration.

General Comments

The DEIS is very general in documenting the need for continuance of all facets of the four projects. Since the majority of the anticipated adverse impacts of project maintenance will affect fish and wildlife resources only, it would seem appropriate to mitigate or offset these impacts through project modifications, whenever possible, to obtain overall beneficial impacts to all interests from continued project implementation. This could be obtained by incorporating changes in control gate operation procedures as first recommended by the United States Fish and Wildlife Service (FWS) with NMFS concurrence on April 21, 1976, and again by FWS on April 1, 1977 and by NMFS on July 19, 1977. Implementation of the FWS and NMFS plan for control gate operation would greatly enhance the project area's contributions to marine fishery resources by allowing the project area to at least partially function as an estuarine nursery for early life stages of marine fishery resources. Since the projects should be maintained to serve multiple purposes, including fish and wildlife resources, we believe the Final Environmental Impact Statement (FEIS) should more thoroughly address the FWS and NMFS recommendations. In addition, the FEIS should include those studies which have been deferred until fiscal year 1980 that are tantamount to resolving the Corps objections for not implementing the FWS and NMFS recommendations.

The FEIS should also discuss the value and importance of marshes and other wetlands in more detail. Specifically, information on the role of these wetlands in fishery production, their value and the economic importance of the fishing industry which relies on fishery resources would be appropriate.

Specific Comments

Section 1 - Project Descriptions

Page I-1, paragraph 1.01 Name and Location

The FEIS should note that project impacts and influence extend well past State Highway 82 on the eastern side of the project area.

1.02 PURPOSE, STATUS AND PLAN

b. Mermentau River, Louisiana

Page I-3 (3) Operation of water control structures.

A discussion of the conditions that dictated the change in operations initiated in 1962, which apparently resulted in decreased benefits to fishery resources, should also be presented.

E-IX

Page I-4, paragraph (d) Stage Conditions.

This operational procedure should present relative stage conditions in feet (M.S.L.) which could be expected to optimize overall benefits during the stated period. Also, when conditions are optimum for fishery benefits, the coordinated opening of Freshwater Bayou Lock with Schooner Bayou Control Structure would further benefit fishery production.

Page I-4, paragraph (a)

This paragraph implies that the Catfish Point Control Structure has been operated to allow ingress of juvenile shrimp and crabs since 1962. The FEIS should note that operation of the control structure in this manner was not initiated until 1976.

Page I-4 and I-5, paragraph (2) Maintenance.

The fifth sentence, apparently addressing when maintenance dredging will take place, is not complete. The FEIS should

also provide a description of the 1300 acres of bottom in Lake Arthur that will be used for spoil disposal.

1.04 INTERRELATIONSHIP AND COMPATIBILITY OF PROJECTS WITH EXISTING CORPS OF ENGINEERS OR OTHER AGENCY PROJECTS

Page I-7 paragraph (d) Interrelationship and compatibility of projects.

This paragraph notes that "Improved agricultural drainage resulting from proposed and completed Soil Conservation Service and State of Louisiana projects will have the net cumulative effect of increasing water flows into the Lower Mermentau Basin and, at certain times of the year, increasing water levels in some areas." Should this be the case, management for benefits to fishery resources would apparently be further hampered.

The FEIS should thoroughly discuss how the net cumulative effect of increased water flows and increased water levels in the Lower Mermentau Basin will affect future operation of the water control structures.

Section 2 - Environmental Setting Without the Project

2.03 HYDROLOGICAL ELEMENTS

Page II-11 paragraph e Stages.

The DEIS does not contain Appendix A referred to in this paragraph. The FEIS should include this referenced appendix.

Page II-12 and II-13 paragraph (3) Water quality data.

Tables 1, 2, and 3 referenced in this paragraph are not presented in the DEIS. The FEIS should contain the referenced tables.

Page II-13 to II-18, (5) Description of segments.

Values for sediment chemical oxygen demand (COD) presented on these pages should be standardized.

2.05 ZOOLOGICAL ELEMENTS

b. General description of aquatic animals in area.

Page II-25 paragraphs (1) Stream-lake fishes and zooplankton and (2) Estuarine fishes and zooplankton.

A more thorough discussion of aquatic animals in the project area should be presented in the FEIS. Gunter and Shell (1958) reported on the aquatic fauna inhabiting the Mermentau River Basin both before and after impoundment.

(4) Use of aquatic organisms.

Page II-26 paragraph (a) Commercial.

A literature citation should be provided where specific data are presented. In addition, commercial fishery landings at area ports should be reported for a range of years up to and including 1978 data, since a report for one year may cover a record harvest or an unusually poor harvest. Values should also be denoted as being either ex-vessel or market price.

Page II-26 paragraph (b) Sport fishing.

This paragraph should be expanded to include a more detailed listing of recreationally important species.

XI-9

Page II-32, 2.09 FUTURE ENVIRONMENTAL CONDITIONS OF THE PROJECT AREA WITHOUT THE PROPOSED PROJECTS

This paragraph should note some of the beneficial impacts which would occur without the proposed projects. For instance, increased fishery production as a result of more accessibility by early life stages of living marine resources, reduced shoreline erosion in Grand and White Lakes as a result of overall lowered water levels during certain parts of the year, and a probable increase in exported detritus and nutrients from a presently impounded area.

This paragraph attributes most of the adverse impacts named to the Mermentau River system proper and, except in a general way does not address impacts, either beneficial or adverse, which might occur in other areas within the projects' influence. In order to completely assess the future environmental conditions without the proposed projects, all identifiable impacts, both beneficial and adverse, should be discussed in the FEIS.

SECTION 4 PROBABLE IMPACTS OF THE PROPOSED ACTIONS ON THE ENVIRONMENT

4.02 BENEFICIAL AND ADVERSE IMPACTS

(b) Adverse impacts of maintenance.

(4) Water resources.

Page IV-4 paragraph (a) General.

This paragraph should note that approximately 1300 acres of water bottoms in Lake Arthur will be impacted as a result of spoil deposition as stated on Page I-5, paragraph 1.

Page IV-5 paragraph (5) Aquatic resources.

This paragraph states that "maintenance of the lower Mermentau River between the gulf and the Catfish Point Control Structure will permit easier access by marine species to the marshes..." While this may be true for adults of some species, earlier life stages of most marine species depend on incoming tides for ingress into estuarine areas and as such do not require a maintained channel for entry. In fact, quite the opposite may be true since increased water velocities in a maintained channel could flush many early life stage organisms out of the estuary during times of flood water release. Also, the loss of shoreline marshes to deposition of dredged material further reduces available escape routes to these organisms during flood conditions.

(8) Economic and Social Impacts.

Page IV-6 and IV-7 paragraph (c) Mermentau River, Louisiana.

The last sentence in this paragraph implies that the Schooner Bayou control structure was, or will be, operated to provide juvenile shrimp access to the basin. We are not aware of this having been the case, nor presently planned for the future. The FEIS should clarify this statement.

Page IV-8 paragraph (c) Adverse impacts of water control structure operation.

The FEIS should note that the present operational procedures are primarily responsible for blockage of the normal cycle of estuarine-dependent organisms. It should also be noted that under present operational procedures, seemingly little consideration is given to fishery resources. The control structures apparently are not operated for fishery resources during periods when maximum benefits would occur, if even the slightest adverse impacts would result on another use. Although section 1 of the EIS does note the coordinated opening of Catfish Point Control Structure during periods of maximum organism abundance, this is more of a working agreement, used when possible, rather than an operational procedure.

SECTION 6 - ALTERNATIVES TO THE PROPOSED ACTION

6.02 NONSTRUCTURAL ALTERNATIVES

Page VI-2 paragraph (b) Proposed operations schedules for control structures.

The FEIS should note that the NMFS, by letters of March 30, 1979 to FWS and July 19, 1977 to the New Orleans District, (NOD) concurred with and supported the FWS Plan. The FEIS should also note that NMFS recommended another alternative (that of relocating the irrigation system in the vicinity of Schooner Bayou Control Struture to a more distant location) which would allow more flexibility in the operation of Schooner Bayou Control Structure.

c. New Orleans District response to the USFWS proposed operation schedule.

Page VI-3 paragraph (1).

The statement that operation of the control structure from July 1 to September 30 as suggested by FWS will reduce the amount of freshwater available for irrigation, seems to conflict with a later statement (page VI-5 paragraph 1) that a drawdown during this period will not seriously deplete irrigation water supplies in the Mermentau Basin. Also, the FEIS should discuss the factors that may require water levels outside the limits the FWS and NMFS recommended for the balance of the year. Approximate stages these other factors would require should be provided.

Page VI-4, first paragraph

The statement that operation of the Schooner Bayou structure in a manner similar to the Catfish Point Structure would result in increased, adverse salinity levels in Schooner Bayou seems to be speculative. Establishment of a salinity monitoring program at Schooner Bayou Control Structure would accurately identify periods when the structure would or could not be operated in such a manner. Even limited operations similar to Catfish Point Structure, when salinities allow such operation, would be preferable to the present procedure and would result in increased benefits to fishery resources.

Relocation of the irrigation intakes on Schooner Bayou to more distant locations, as suggested by NMFS letter to the NOD dated July 19, 1977, would further reduce salinity control problems.

VI-10

Page VI-4 paragraph (4)

The FEIS should clarify which survey study, the present one or the one referenced in this paragraph, is the optimum study for project modification and implementation. Due to the nearness of FY80, if the present study cannot incorporate suggested project modifications in the FEIS, a timetable for study results should at least be formulated and presented in this FEIS.

6.03 SOCIOECONOMIC IMPACTS OF NO ACTION

c. Displacement of people, businesses, and farms.

Page VI-5 and VI-6 paragraph c.

The referenced letter from the mayor of Crowley, Louisiana, seems to further support the contention that the Schooner Bayou Control Structure could be intermittently operated to allow ingress of marine organisms without seriously affecting the quality of rice irrigation water. The FEIS should more thoroughly discuss the points raised by Mr. Gielen, e.g. today most rice irrigation water is pumped from deep wells.

SECTION 7 - THE RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF MAN'S ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF *LONG TERM PRODUCTIVITY*

Page VII-1 and VII-2 7.02 WATER CONTROL STRUCTURE

The discussion on these two pages seems to imply that all the procedures FWS suggested were implemented. We are not aware of this being the case. The FEIS should more clearly delineate which recommended procedures were implemented by the Corps. We also disagree that the long-term impacts of following the suggested FWS and NMFS recommended procedures would cause a loss of freshwater species in Grand and White Lakes and cause a reversion of fresh water marsh species to a more brackish marsh. While unregulated openings of the control structures would probably eventually lead to some spatial shifts by fishery species, a regulated and coordinated program of gate openings should not result in major species replacement of either fish or vegetation. The partial implementation of the FWS recommendations in 1976, primarily as regards the Catfish Point Control Structure, resulted in greatly increased marine fishery benefits without any identifiable adverse impacts to other uses of the lakes' systems.

Clearance Signature and Date

Kenneth R. Roberts - FT [signature] 9/19/79

United States Department of Agriculture

Soil Conservation Service

3737 Government St,
Alexandria, LA 71301

September 27, 1979

Colonel Thomas A. Sands
District Engineer
LMNPD-RE
Corps of Engineers
P. O. Box 60267
New Orleans, LA 70160

Dear Colonel Sands:

Re: Draft Composite Environmental Statement Operations and Maintenance on Four Projects in the Mermentau Basin, Louisiana.

The following is offered as a correction and update to paragraph b, page I-7:

1. Seventh Ward Canal Watershed and Bayou Blue Watershed should be added to the watersheds mentioned.

2. A sentence should be added at the end of this paragraph as follows: Bayou Mallet and Bell City watersheds are in the active planning phase.

XI-11

Sincerely,

Alton Mangum
State Conservationist

cc: Director, Office of Federal Activities
Environmental Protection Agency
Washington, D.C.

Director, Environmental Services
SCS, Washington, D.C.

Office of the Coordinator of Environmental Quality Activities
Washington, D.C.

FEDERAL ENERGY REGULATORY COMMISSION
WASHINGTON 20426

August 20, 1979

Colonel Thomas A. Sands
District Engineer
New Orleans District
Corps of Engineers, Department of
the Army
P. O. Box 60267
New Orleans, LA 70160

Dear Colonel Sands:

I am replying to your request of July 25, 1979 60 the Federal Energy Regulatory Commission for comments on the Draft Environmental Impact Statement for the Operation and Maintenance of Four projects in the Mermentau Basin, Louisiana. This Draft EIS has been reviewed by appropriate FERC staff components upon whose evaluation this response is based.

The staff concentrates its review of other agencies' environmental impact statements basically on those areas of the electric power, natural gas, and oil pipeline industries for which the Commission has jurisdiction by law, or where staff has special expertise in evaluating environmental impacts involved with the proposed action. It does not appear that there would be any significant impacts in these areas of concern nor serious conflicts with this agency's responsibilities should this action be undertaken.

Thank you for the opportunity to review this statement.

Sincerely,

Jack M. Heinemann
Advisor on Environmental Quality

PD-R

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
FT. WORTH REGIONAL OFFICE
1100 COMMERCE STREET
DALLAS, TEXAS 75202 NEW ZIP CODE 75202

REGION VI

IN REPLY REFER TO:

October 1, 1979

Thomas A. Sands, Colonel, C.E.
District Engineer
U.S. Army Engineers, New Orleans District
P. O. Box 60267
New Orleans, Louisiana 70160

Dear Colonel Sands:

The Draft Composite Environmental Impact Statement for the Operations and Maintenance of Four Projects in the Mermentau Basin, Louisiana, submitted with your letter of July 25, 1979, has been reviewed in the Department of Housing and Urban Development's New Orleans Area Office and Dallas Regional Office and it has been determined that the Department will not have comments on this statement.

Sincerely,

Victor J. Hancock
Environmental Clearnace Officer

XI-12

AREA OFFICES
DALLAS, TEXAS · LITTLE ROCK, ARKANSAS · NEW ORLEANS, LOUISIANA · OKLAHOMA CITY, OKLAHOMA · SAN ANTONIO, TEXAS

State of Louisiana
Department of Transportation and Development

EDWIN EDWARDS
GOVERNOR

GEORGE A FISCHER
SECRETARY

Office of Public Works
P. O. Box 44155 Capitol Station Baton Rouge, Louisiana 70804

August 24, 1979

Colonel Thomas A. Sands
District Engineer
U.S. Army Corps of Engineers
Post Office Box 60267
New Orleans, Louisiana 70160

RE: LMNPD-RE
July 25, 1979
Draft Environmental Impact Statement (EIS)
(1) Mermentau River
(2) Mermentau River, Bayous Nezpique & Des Cannes
(3) Bayou Plaquemine Brule'
(4) Bayou Queue de Tortue

Dear Colonel Sands:

We have received the above referenced letter by which you forwarded the draft composite Environmental Impact Statement for the operation and maintenance of the four existing projects. You requested our comments concerning this draft.

We have made a preliminary review of the document as relates to the structural measures for operation and maintenance. We have no comments to make concerning the archaeological, wild life and fisheries or environmental sections of your draft statement. Section 4 of your document pertains to probable impacts of the proposed actions on the environment. In this section Paragraph 4.03 indicates that up land dredged material sites will be diked and equipped with spill boxes and adjustable weirs. It would be appropriate that the draft statement only indicate various types of dredging activities without making a definite statement concerning which sections will be dredged in what manner.

The Office of Public Works has consistently objected to local interest being charged with furnishing the spoil disposal areas and constructing dikes, spill boxes, adjustable weirs, etc. In view of your current requirements we will no doubt, in most cases, require your office to develop plans for the utilization of bucket type equipment, except in large water bodies where spoil disposal sites may be remote to the channel improvement. Under Section 6 you list structural alterations and this item does include bucket dredging, casting and stacking under 6.01C.

In the event that further discussions or comments are needed, we will be glad to furnish same or to meet with you as needed.

Sincerely yours,

ROY AGUILLARD
ASSISTANT SECRETARY
RA:sl

DEPARTMENT OF WILDLIFE AND FISHERIES
J. BURTON ANGELLE
SECRETARY
400 ROYAL STREET
NEW ORLEANS 70130
EDWIN EDWARDS
GOVERNOR

25 September 1979

Colonel Thomas Sands
Corps of Engineers
New Orleans District
Post Office Box 60267
New Orleans, LA 70160

RE: Composite Environmental Impact Statement -- Mermentau Basin, Louisiana

XI-13

Dear Sir:

We cannot support the above referenced projects in light of the data presented in the EIS describing the bottom sediments throughout the system. These data describing the COD and Hg concentrations are particularly disturbing even though we realize that the mg/g designation of concentration is a typographical error.

We consider portions of the proposed projects to be unconscionable given the probable effects upon fisheries and human health by the introduction of toxins into the food chains and high oxygen demanding materials into the waters, particularly since fisheries, human health and the economy were severely impacted by the cholera outbreak in 1978. Although the cholera problem was localized in 1978, the seafood industry of the entire state was adversely affected. We wish to avoid any future recurrence of this type of problem. However, the presence of mercury in the sediments and the possibility of its introduction into seafood organisms increases the potential for a new round of national exposure.

We find the Lake Arthur portion of the project particularly objectionable. Lake Arthur is extensively utilized by sport and commercial fishermen. Chemically reduced materials in the sediments plus other chemical oxygen demanding and biochemical oxygen demanding substance will cause severe oxygen depletion in Lake Arthur, particularly since spoil is proposed to be placed on the lake bottom. The result will be direct fish mortalities and possible contamination of survivors. Contaminants within the bodies of the dead fish will be translated and concentrated further up the food chains via scavenging terrestrial species and birds while concomittantly increasing the chance for a botulism outbreak.

Fisheries losses by direct mortality caused by the project construction must be compensated for by reimbursement to the state at the current species and size range monetary values. Monies for that purpose should be made an integral part of the project costs and thus a factor in any benefit/cost ratio. We did not find this problem addressed in the EIS.

The statement does address possible adverse economic impacts on agriculture and the petroleum industry if the no action alternative is chosen, and states that increases in commercial fisheries would only partially compensate for losses in other areas. The inverse of the situation is not addressed with equal emphasis in the document with the exception of shrim and crabs.

It is our opinion that interrelated projects further up the watershed are not adequately addressed, particularly since they play a major role in the flooding problems in the project area. If this project is designed for flood control, at least in part, it follows that the origin of these flooded waters, and their nature, should be addressed.

We do not concur with the statement on page IV-3 that "clearing and snagging will not interfere with wildlife resources on a permanent scale ...". Snagging destroys fish habitat by removing protective cover and spawning areas. Snagging also removes substrate upon which fish food organisms grow and feed. The resultant is overall reduction in the carrying capacity of a stream segment. That means a permanent or relatively permanent reduction in fisheries production. Clearing or the removal of overhanging vegetation drastically changes the nature of the riparian lands and changes the characteristics of the stream by increasing insolation. We know that nothing is permanent in geologic time, but there are degrees of permanence. Therefore, there are degrees of permanence attached to the effects on fish and wildlife associated with these projects.

It is the position of this agency that the projects will lower the overall diversity and productivity of the Mermentau system and contributaries to a degree that will not be beneficial to fish and wildlife resources or to those who utilize these resources. We also feel that, as a result of these projects, unacceptable materials will be introduced into a series of food chains which will be contrary to the best long term interests of the human population.

Sincerely,

J. Burton Angelle
Secretary

JBA:MBW:ms

DEPARTMENT OF WILDLIFE AND FISHERIES

J. BURTON ANGELLE
SECRETARY

400 ROYAL STREET
NEW ORLEANS 70130

EDWIN EDWARDS
GOVERNOR

4 October 1979

Colonel Thomas Sands
District Engineer
New Orleans District
U. S. Corps of Engineers
Post Office Box 60267
New Orleans, LA 70160

RE: Additional Comments -- Mermentau Basin Louisiana Project

AI-14

Dear Sir:

We submitted comments on the above referenced project to your office on September 25, 1979. The following constitutes additional comments, and we request that you append them to our previous letter.

As a result of these projects, the following problems are envisioned.

1. Productive marshlands will be lost by conversion of land area to water bottoms as a result of maintaining higher water levels in the marsh.

2. Natural water fluctuations which have been instrumental in maintaining desireable vegetative food and cover for marsh animals will be destroyed; i.e. millet and other annuals will be lost, reducing the carrying capacity of the area for waterfowl.

3. There will be increased flooding in the lower portions of the basin from more rapid runoff from the upper basin. Flooding presently seems to be a problem due to the "new cut" recently completed at the mouth of the Mermentau. This cut which shortened the distance that boat traffic must travel down the Mermentau to the Gulf has been implicated by area residents in the recent flooding and destruction caused by tropical storm Claudette.

4. There will be a loss of potential spawning habitat for the anadromous striped bass. The Louisiana Department of Wildlife and Fisheries has stocked 198,991 stripers in the Mermentau since 1972 as part of the state's anadromous fish program.

   The critical time for striped bass egg hatching after spawning in fresh water is three days in suspension. Cutting off bends and speeding up water flow by snagging and dredging may infringe upon this critical time frame and lessen the chances of successful hatching of the eggs.

5. Page I-7, Item b. There are additional Soil Conservation Service watershed projects in the Mermentau Basin that should be reviewed.

6. Page I-7, Item d. The impacts of Soil Conservation Service projects are only mentioned. The impacts and damages to the basin should be further investigated in this statement.

7. Page ii-22. (3) Game Birds. List blue-winged teal as resident?

8. Page II-24. Species protected under the Marine Mammal Act should be reviewed.

9. Page II-25. (86.1) Stream-lake fishes and zooplankton. Should mention that though fishes above the structures are mostly freshwater species, saltwater species are present.

   1. Morton, T. 1973. The ecological effects of water control structures on an estuarine area, White Lake, Louisiana, 1972-1973. M. S. Thesis, University of Southwestern Louisiana.

   2. Perry, W. G. 1978. Distribution of fish in the Rockefeller-Grand Lake tidal bayou complex, southwest Louisiana. Proc. Louisiana Acad. Sci. XLI:101-114.

   3. Perry, G. Seasonal occurrence of fishes in Grand Lake and White Lake, Louisiana, 1977-1979. (in preparation)

   The classic study of the fishes before this development in the basin by Gunter (Gunter, G., and W. E. Shell. 1958. A study of an estuarine area with water level control in the Louisiana marsh. Proc. Louisiana Acad. Sci. 21:5-34) revealed that, both in numbers and species, marine and estuarine organisms dominated.

10. Page II-26. (4,6) Sport Fishing. The Louisiana Department of Wildlife and Fisheries has released 198,991 of the anadromous striped bass in the Mermentau River systems since 1972. This should prove to be an additional species available to sports fishermen.

11. Page II-26 (4,e). Endangered and/or Threatened. The EIS does not mention Atlantic sturgeon, Acipenser oxyrhynchus. A specimen of Atlantic sturgeon was caught by Mr. Hugh Mhire in an otter trawl while shrimping in the Gulf off the mouth of the Mermentau River.

12. Page II-28 (2,b) Status of Cultural Resource Survey. Another ground survey of the lower Mermentau will probably reveal some interesting sites. Mr. Paul Coreill, Marine Extension Agent, Cameron, Louisiana, has indicated knowledge of several sites in the area.

13. Page III-1 (3.02) Conflicts of proposed action with existing or proposed land use plans. "Areas may possibly be reclaimed and used for agricultural and/or industrial use". This action would conflict with fish and wildlife resource development and enhancement.

14. Page IV-1. 4.01 (6) Saltwater barrier operation. Beside removing the areas from estuarine productivity, changing salinity regimens will serve to encourage aquatic weed problems which our state is already spending millions on. Presently salt water periodically enters this system, killing back much of this growth.

15. Page VI-3, Item C. Although the present operation of the structure has resulted in some benefits to fishery resources, there is still room for improvement.

16. Page VII-2 (7.02) Water Control Structures. "The long term impact .... be loss of freshwater species ....". Experience gained through field sampling lead us to believe that the salinities the system will be subjected to will not be as harmful as stated.

17. Plates. The disposal areas illustrated in the plates indicate that some extremely productive water bottoms will be destroyed for fisheries.

Sincerely,

J. Burton Angelle, Secretary

JBA:MBW:ms

XI-15

STATE OF LOUISIANA
DEPARTMENT OF CULTURE, RECREATION AND TOURISM
OFFICE OF PROGRAM DEVELOPMENT

EDWIN W. EDWARDS
Governor

E. BERNARD CARRIER, PhD
Assistant Secretary

J. LARRY CRAIN, P.
Secretary

October 11, 1979

Mr. Jedfrey Carlton
U.S. Army Corps of Engineers
P. O. Box 60267
New Orleans, Louisiana 70160

Re: LMNPD-RE
Draft composite environmental impact statement
Mermentau River basin

Dear Mr. Carlton,

In reviewing the cultural resources sections of the report referenced above, and the cultural resources survey reports of the component parts of the Mermentau River basin work, we were unable to locate passages in the report which specifically identify sites as eligible or ineligible for inclusion in the National Register of Historic Places. My staff has consulted with the cultural resources section of the New Orleans district, but they have not been able to locate this information so far. It appears that no effect to cultural resources in the Bayou Plaquemine Brule and Bayou Queue de Tortue project areas will occur, and since cultural resources surveys of the Mermentau River, Louisiana project are forthcoming, our concern is with the Mermentau River, Bayous Nezpique and Des Cannes. Our copy of the survey report of the latter project does not contain Appendix II. It may be that this appendix provides the information we need.

We would appreciate it if you could furnish this information to us, so that we may complete our review of this project.

Thank you for your cooperation in this matter.

Sincerely,

E. Bernard Carrier, Ph.D.
State Historic Preservation Officer

EBC/DW/nj

DIVISION OF ARCHAEOLOGY AND HISTORIC PRESERVATION
P. O. Box 44247 Baton Rouge, La. 70804 504 342-8682

WILLIAM C. HULS
SECRETARY

DEPARTMENT OF NATURAL RESOURCES
OFFICE OF FORESTRY
(LOUISIANA FORESTRY COMMISSION)

D.L. McFATTER
ASSISTANT SECRETARY AND
STATE FORESTER

September 13, 1979

District Engineer
Department of the Army
New Orleans District
Corps of Engineers
P. O. Box 60267
New Orleans, Louisiana 70160

RE: LMNPD-RE
DRAFT
COMPOSITE ENVIRONMENTAL STATEMENT
FOR OPERATIONS AND MAINTENANCE
OF FOUR PROJECTS IN THE
MERMENTAU BASIN, LOUISIANA

MERMENTAU RIVER, LOUISIANA
MERMENTAU RIVER, BAYOUS MEZPIQUE AND
DES CANNES, LOUISIANA
BAYOU PLAQUEMINE BRULE', LOUISIANA
BAYOU QUEUE DE TORTUE, LOUISIANA

XI-16

Dear Sir:

We are in receipt of your letter and attachments of July 25 in connection with the above captioned project, and your request for comments on same.

A careful review of the draft composite environmental statement reveals that 6,100 acres of land and/or marsh will be involved; of which approximately 4,300 acres includes non-marsh, more or less "upland" or emergent areas on which some type of vegetative cover exists, including, perhaps, swamp-type hardwoods such as cypress, tupelo gum, and associated species.

Except for one statement under Section 2.04, BOTANICAL ELEMENTS, item h., concerning merchantable bottomland hardwoods and the understocked nature of the stands, the entire matter of the forested character of the specific project area has been treated, or discussed, too casually and inadequately, in my opinion.

There is considerable discussion of vegetation communities and forests in the aforementioned section 2.04, under items a., b., d., and f., but these references are to the general area of the Mermentau basin and floodplain, and not to the specific 4,300 acres in question.

P.O. BOX 1628 . BATON ROUGE, LA. 70821
5150 FLORIDA BOULEVARD

Since this area was previously used as a disposal site for dredged material, it is quite possible that no merchantable timber exists. I would, however, have to automatically question the statement made in Section 2.04 h., that "...only undersized, second growth trees are left in insufficient quantities to make harvesting practical", unless you care to cite the specifics of the field cruise made to confirm this, and the source of your expert information.

If, in fact, there is a sufficient quantity of merchantable material available, every effort should be made to dispose of this by commercial sale to the highest bidder prior to the beginning of spoil deposition. If no sale can be effected due to low volumes or severe logging conditions, the material should be given away, if possible, rather than be destroyed by spoil and thus completely wasted.

Finally, it is my opinion, in the case of recolonization, mentioned under Section 4.02b. (2), page IV-3, and Section 5.02, page V-1, that these areas will in fact not recolonize with upland species in any reasonable length of time, and certainly not within 2-5 years. More likely, recolonization will be accomplished first with typical pioneer species such as willow and Chinese tallow; and any succession to true upland species, or better quality hardwoods, will be some considerable years into the future.

Assuming the concerns expressed herein are properly addressed and reevaluated, I would have no further comments on or objections to the project as outlined.

Thank you for the opportunity of reviewing this draft composite environmental statement.

VERNON E. ROBINSON - CHIEF, ENVIRONMENTAL RELATIONS

JB

cc: District Forester Miller

August 20, 1979

Colonel Thomas Sands
District Engineer
Department of the Army
New Orleans District
Corps of Engineers
P O Box 60267
New Orleans, Louisiana 70160

RE: LMNPD-RE

Dear Colonel Sands:

We have received the Draft Composite Environmental Statement for operation and maintenance of four projects in the Mermentau Basin, Louisiana; Mermentau River, Louisiana; Mermentau River, Bayous Nezpique and Descannes, Louisiana; Bayou Plaquemine Brule', Louisiana; Bayou Queue de Tortue, Louisiana (June 1979).

We have several general concerns which are typical of these kinds of dredging operations. First, the impact statement indicates that at least 1800 acres of wetlands will be used as disposal sites for dredge spoils. As we have repeatedly urged the New Orleans District, in view of the extensive research which has been done under the Dredged Material Research Program at the Waterways Experiment Station, U.S. Army Corps of Engineers, regarding alternative techniques for disposing of dredge spoils, we believe that feasible alternatives do exist to these kinds of destructive disposal methods.

The New Orleans District should contact that program to investigate alternative ways of disposing of these dredge spoils to avoid any adverse impact to wetlands and to utilize techniques to assure creative utilization of these so-called spoils. The typical disposal operation not only directly destroys wetlands but creates linear barriers to the natural flows of water, sediment and nutrients in the coastal zone. Other than lack of will, there is no excuse for continuation of this kind of operation. We think it would be appropriate for the Waterways Experiment Station, together with the New Orleans District, to put together a comprehensive management plan for disposal of dredge spoils from these four projects. Such a plan we would consider to be a reasonable necessary alternative.

XI-17

Environmental Defense Fund, 475 Park Avenue South, New York, NY 10016 (212) 686-4191
OFFICES IN: NEW YORK, NY (NATIONAL HEADQUARTERS); WASHINGTON, DC; BERKELEY, CA; DENVER, CO

Reference

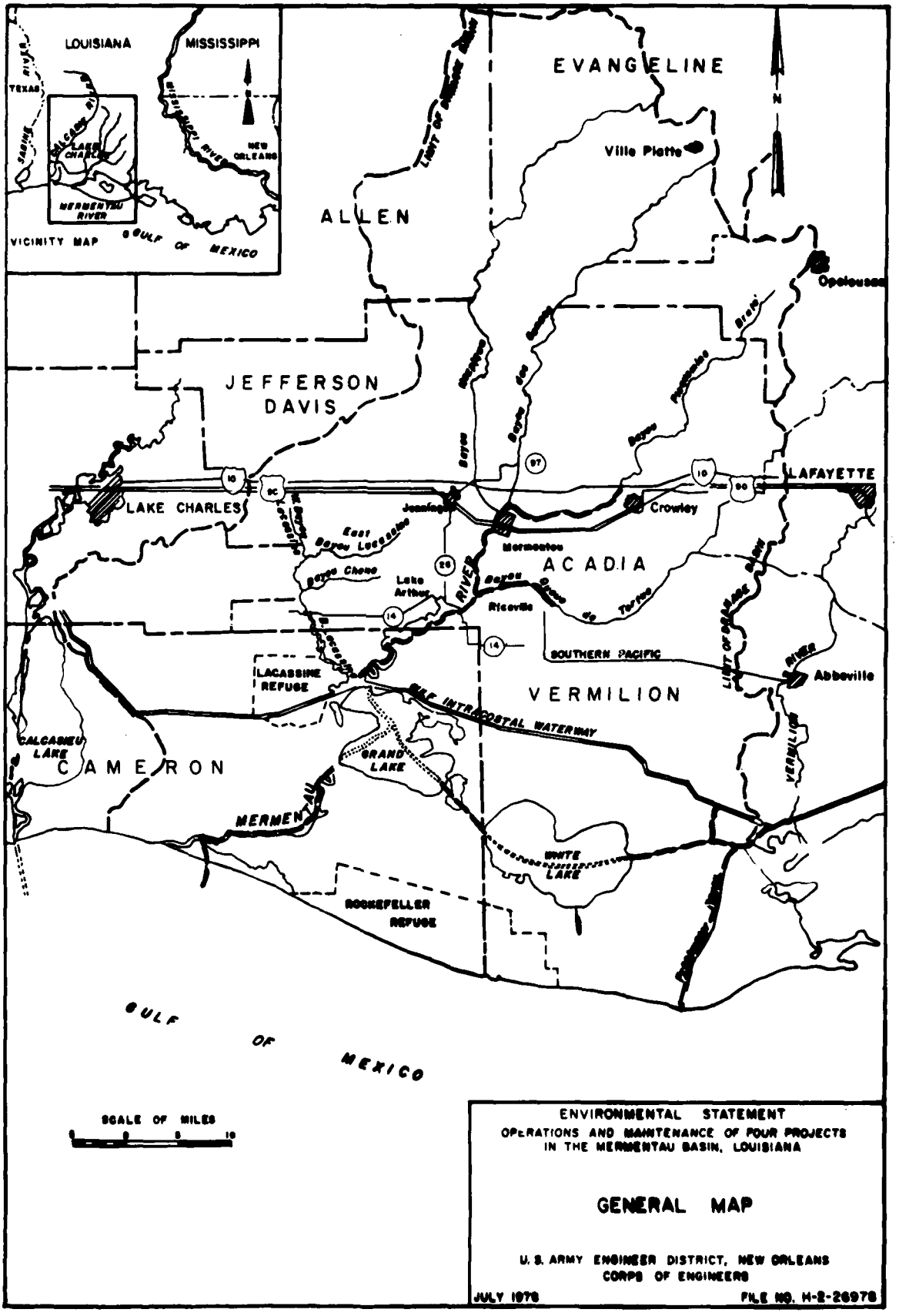
Furthermore, in comments on other environmental impacts, we have pointed out that this kind of channelization and loss of wetlands has severe secondary land loss impacts. Furthermore, the loss of wetlands typically contributes to degradation of water quality since the natural system which is capable of recycling nutrients and other pollutants is diminished. Water quality throughout much of coastal Louisiana is relatively polluted with high levels of nutrients. Many of these nutrients come from agricultural sources, and no existing programs, other than increasing costs of fertilizers, will effectively contribute to control of this non-point source of pollution. On the land loss question, we refer you to Cumulative Impact Studies in the Louisiana Coastal Zone..Eutrophication..Land Loss, edited by M.J. Craig and J.W. Day, Jr., Final Report to the Louisiana State Planning Office (June 30, 1977). This report estimates that in most drainage basins in coastal Louisiana indirect land loss is two to three times direct land loss due to construction and maintenance of channels. On-going studies of land loss in coastal Louisiana, we understand, suggests that land loss, which has been estimated to be in excess of 16.5 square miles per year, is substantially greater than that and accelerating.

In view of the severity of these land loss and water quality problems, we think it is particularly encumbent upon the New Orleans District to develop the kind of dredge material management plan which we have described with the Waterways Experiment Station. Given the lack of this kind of analysis and development of this kind of management plan, we consider the EIS to be inadequate.

Yours very truly,

James T.B. Tripp
Counsel

cc: Adlene Harrison
Russell Ernest
Cary Kerlin



ENVIRONMENTAL STATEMENT
OPERATIONS AND MAINTENANCE OF FOUR PROJECTS
IN THE MERMENTAU BASIN, LOUISIANA

GENERAL MAP

U. S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS

JULY 1978 FILE NO. H-2-26978

PLATE I

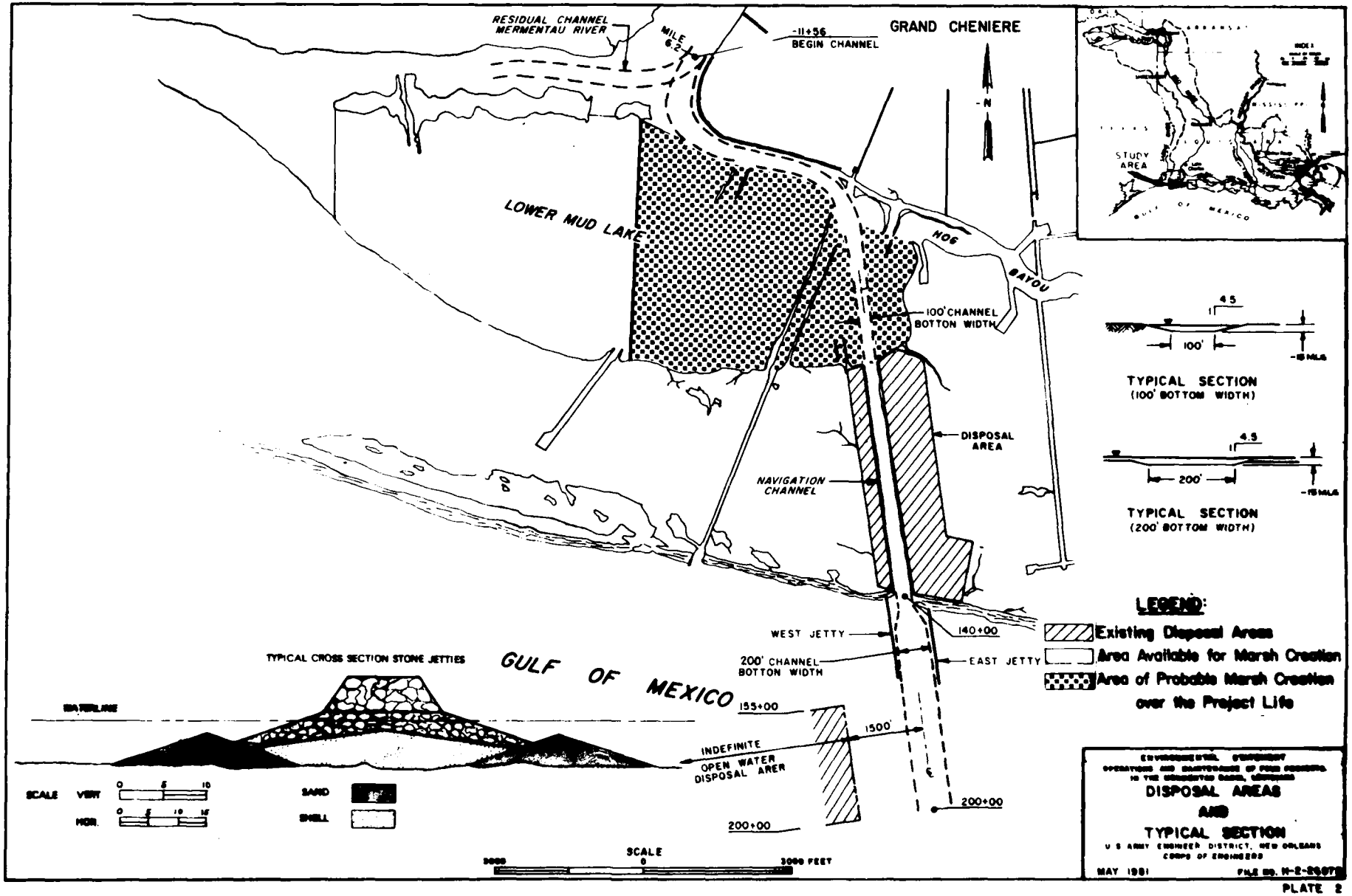
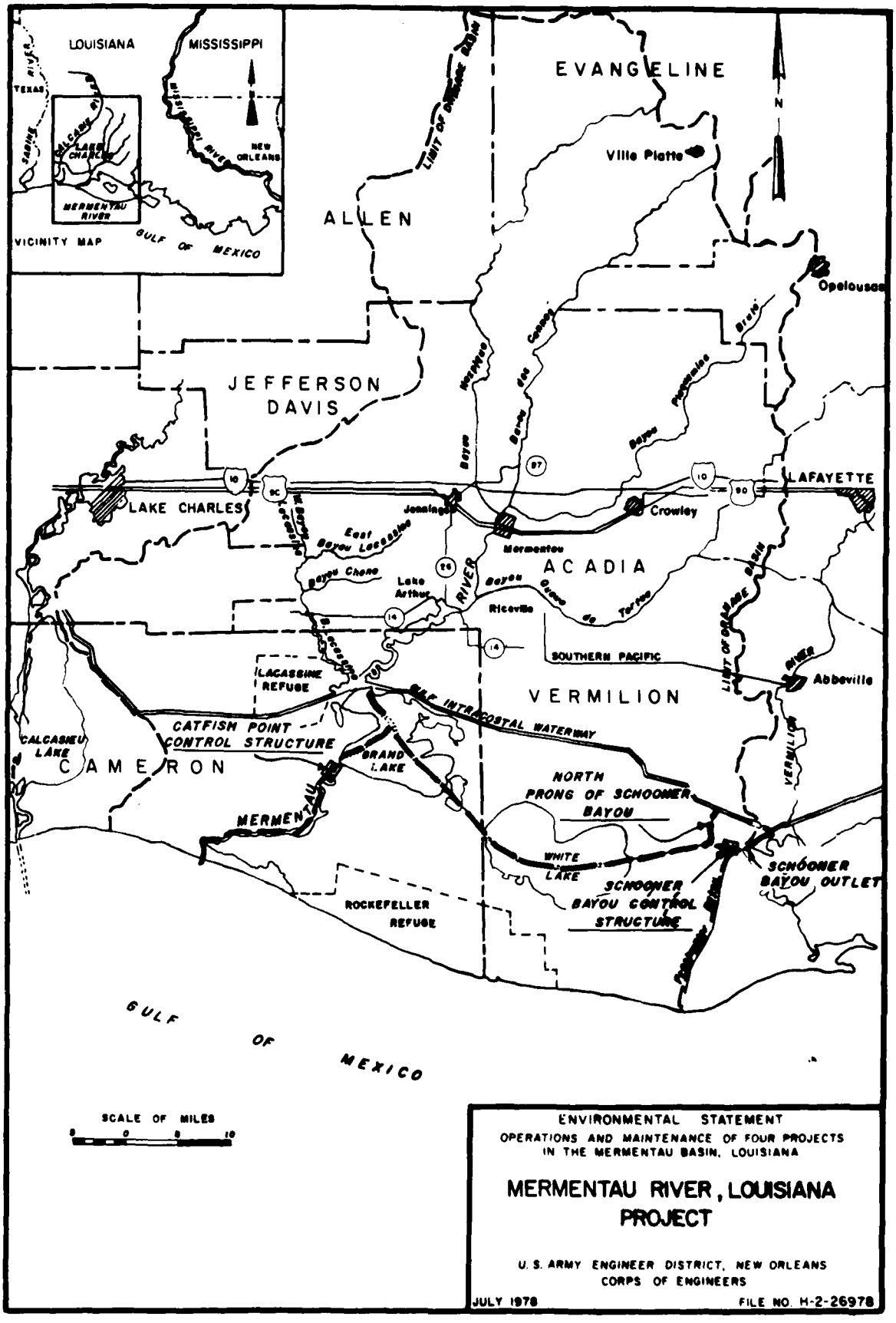

RESIDUAL CHANNEL
MERMENTAU RIVER
MILE 6.2
-11+56
BEGIN CHANNEL
GRAND CHENIERE
N
LOWER MUD LAKE
HOG BAYOU
100' CHANNEL
BOTTOM WIDTH
DISPOSAL AREA
NAVIGATION CHANNEL
WEST JETTY
140+00
EAST JETTY
200' CHANNEL
BOTTOM WIDTH
GULF OF MEXICO
155+00
1500'
INDEFINITE
OPEN WATER
DISPOSAL AREA
200+00
200+00
STUDY AREA
GULF OF MEXICO
4:5
100'
-15 MLG
TYPICAL SECTION
(100' BOTTOM WIDTH)
4:5
200'
-15 MLG
TYPICAL SECTION
(200' BOTTOM WIDTH)
TYPICAL CROSS SECTION STONE JETTIES
WATERLINE
SCALE VERT 0 5 10
HOR. 0 5 10 15
SAND
SHELL
SCALE
0 3000 FEET
LEGEND:
Existing Disposal Areas
Area Available for Marsh Creation
Area of Probable Marsh Creation over the Project Life
ENVIRONMENTAL STATEMENT
OPERATIONS AND MAINTENANCE OF FOUR PROJECTS IN THE CALCASIEU BASIN, LOUISIANA
DISPOSAL AREAS AND TYPICAL SECTION
U S ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
MAY 1981
FILE NO. N-E-29079

PLATE 2



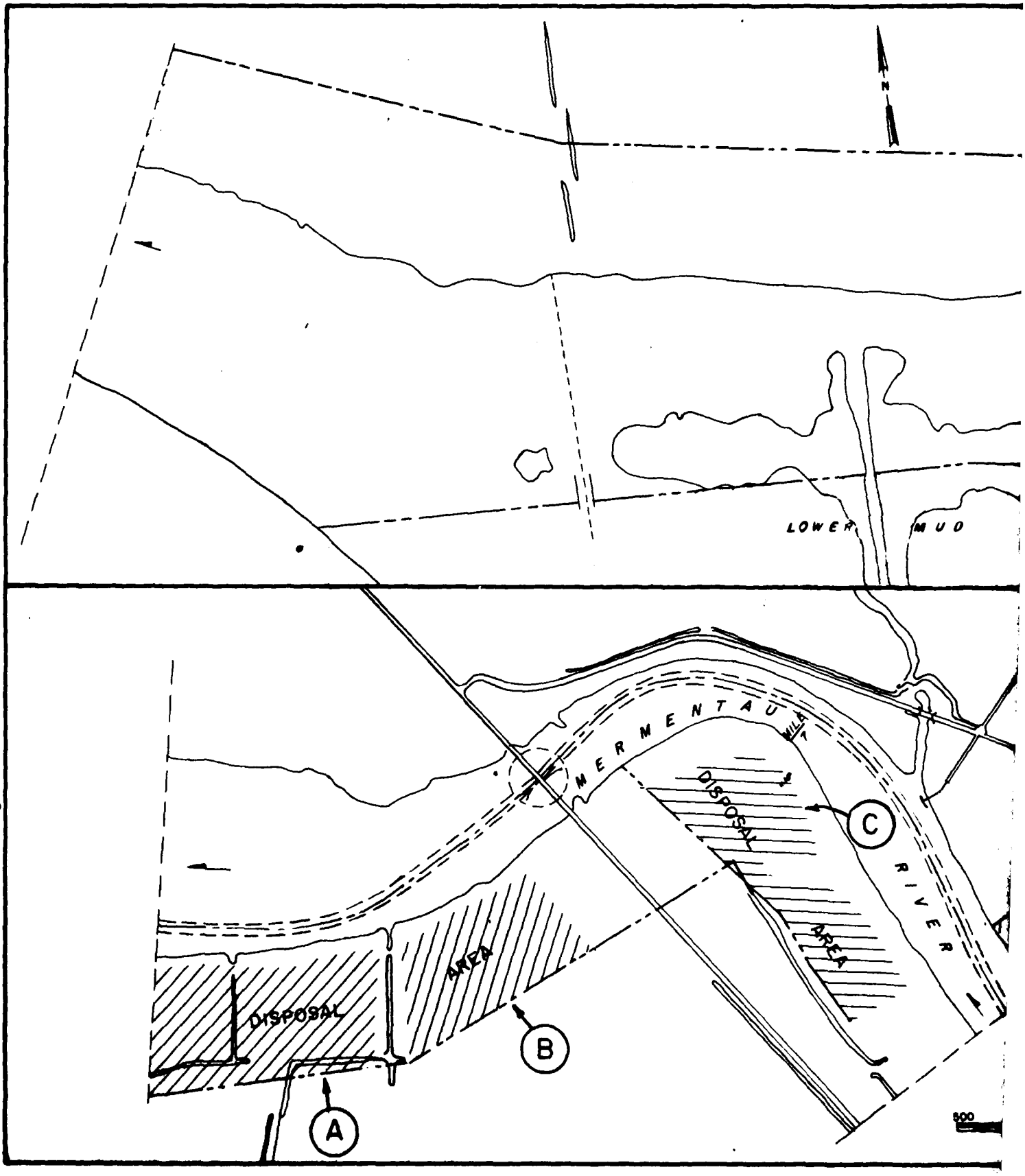
ENVIRONMENTAL STATEMENT
OPERATIONS AND MAINTENANCE OF FOUR PROJECTS
IN THE MERMENTAU BASIN, LOUISIANA

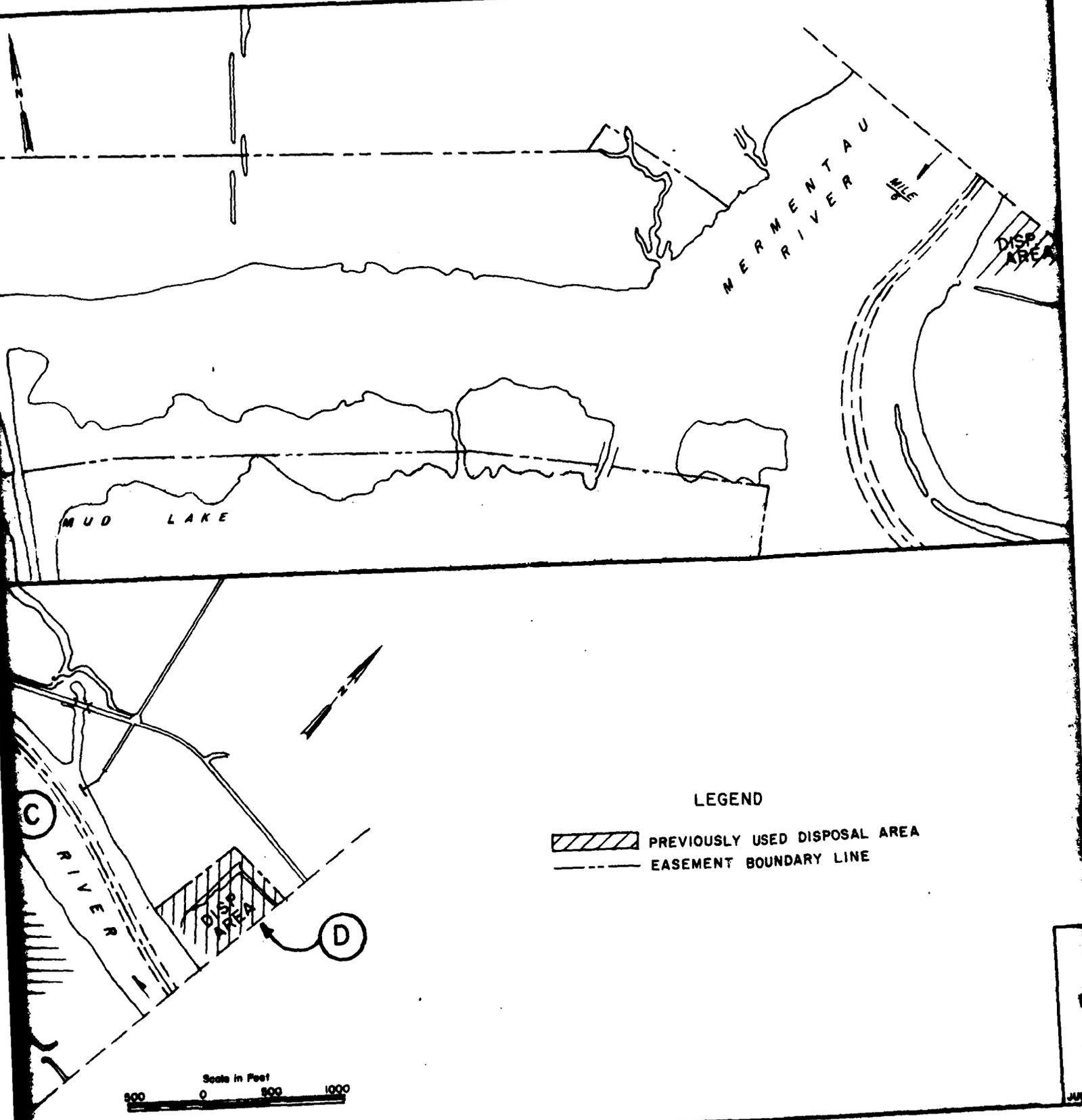
MERMENTAU RIVER, LOUISIANA PROJECT

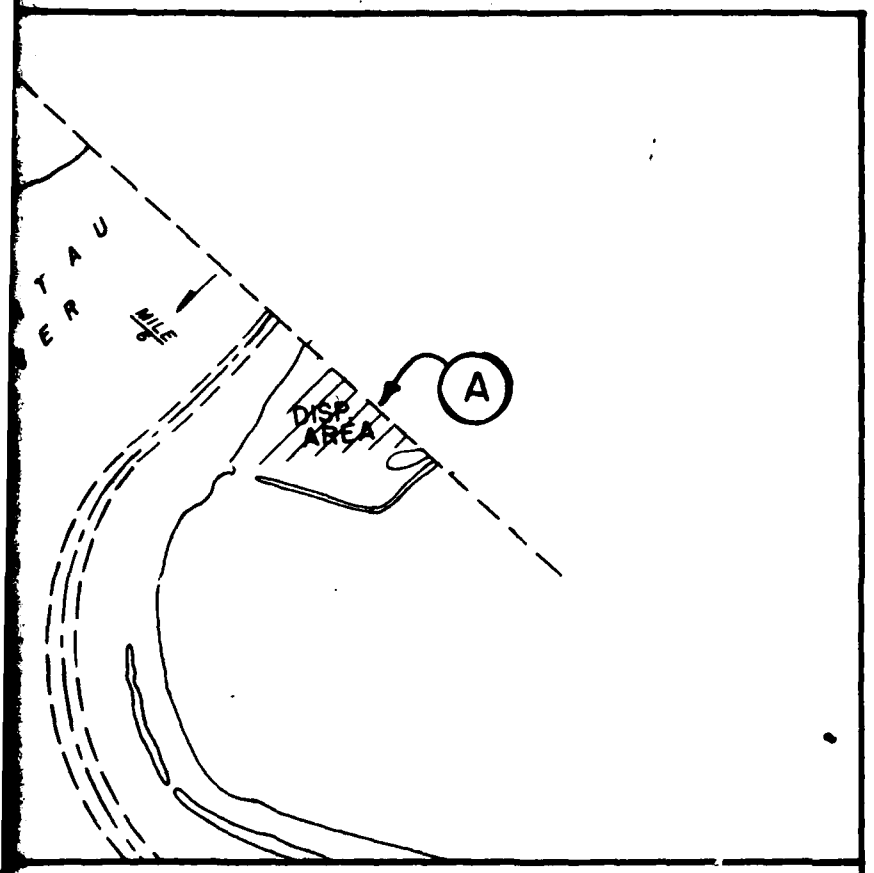
U. S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS

JULY 1978 FILE NO. H-2-26978

PLATE 3


N
LOWER
MUD
MERMENTAU
RIVER
DISPOSAL
AREA
DISPOSAL
AREA
A
B
C
500


N
MERMENTAU RIVER
MILE
DISP AREA
MUD LAKE
N
C
RIVER
DISP AREA
D
Scale in Feet
500 0 500 1000
LEGEND
PREVIOUSLY USED DISPOSAL AREA
EASEMENT BOUNDARY LINE



AL AREA
NE

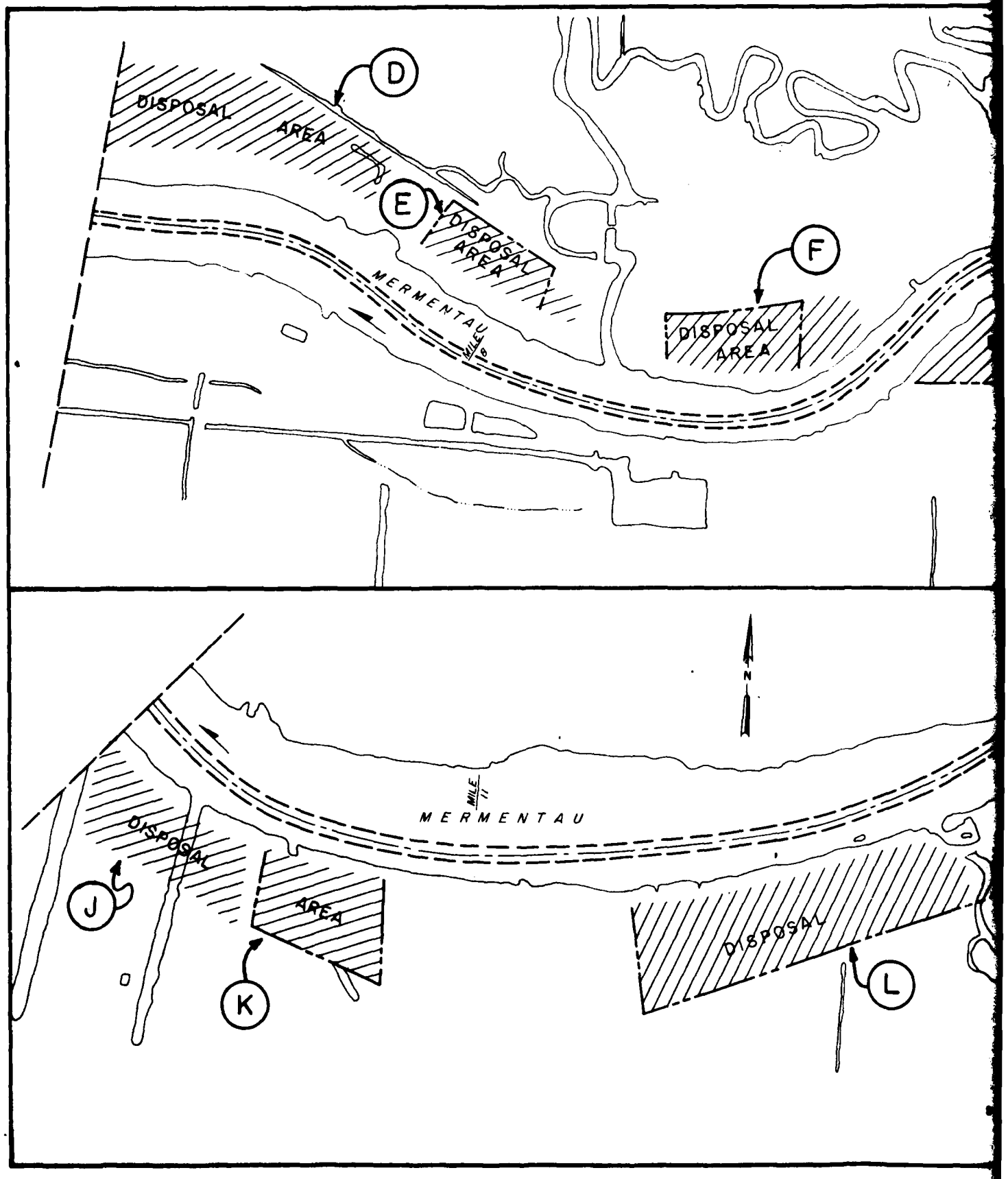
ENVIRONMENTAL STATEMENT
OPERATIONS AND MAINTENANCE OF FOUR PROJECTS
IN THE MERMENTAU BASIN, LOUISIANA

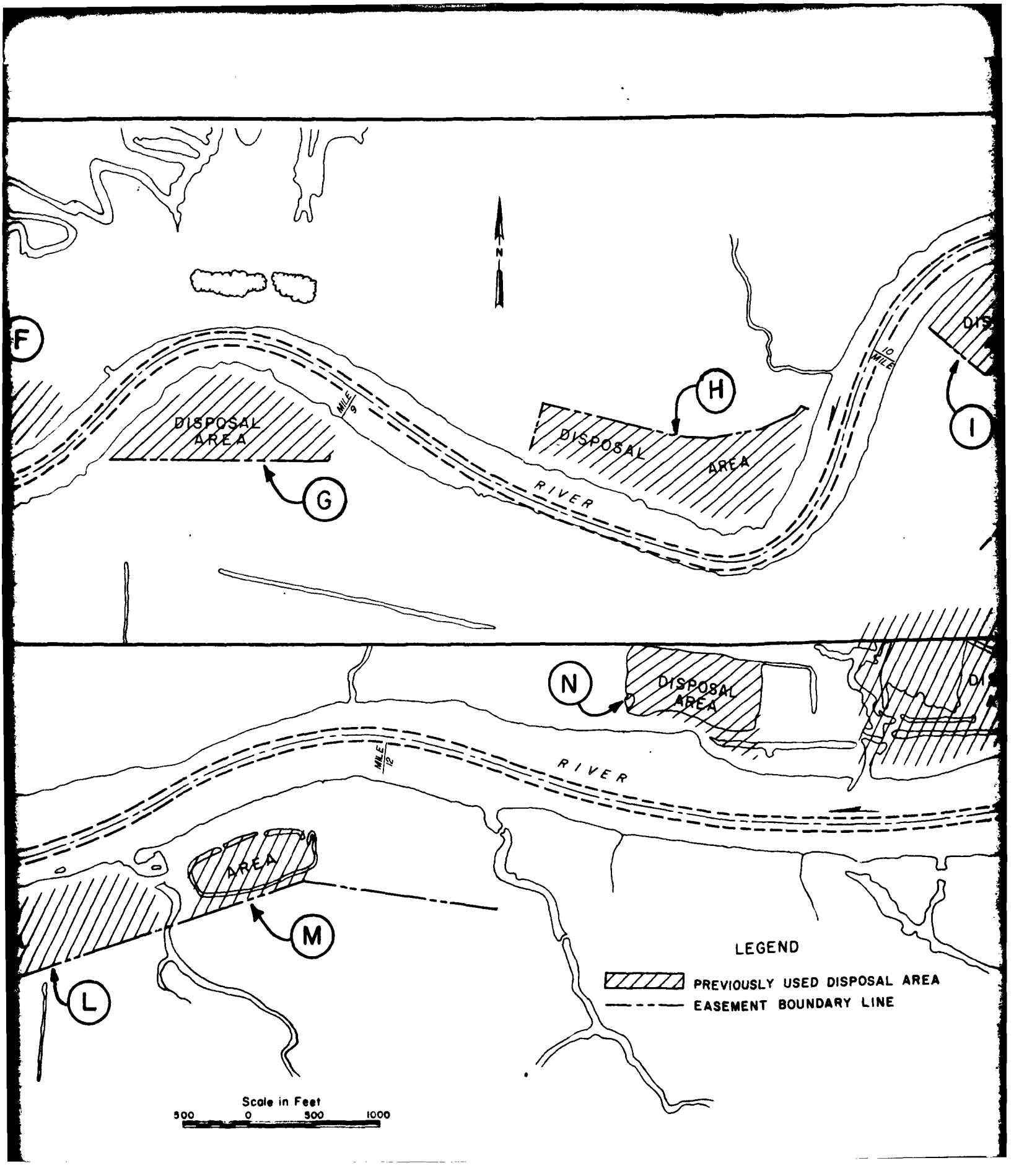
MERMENTAU RIVER, LA. PROJECT
DISPOSAL AREAS

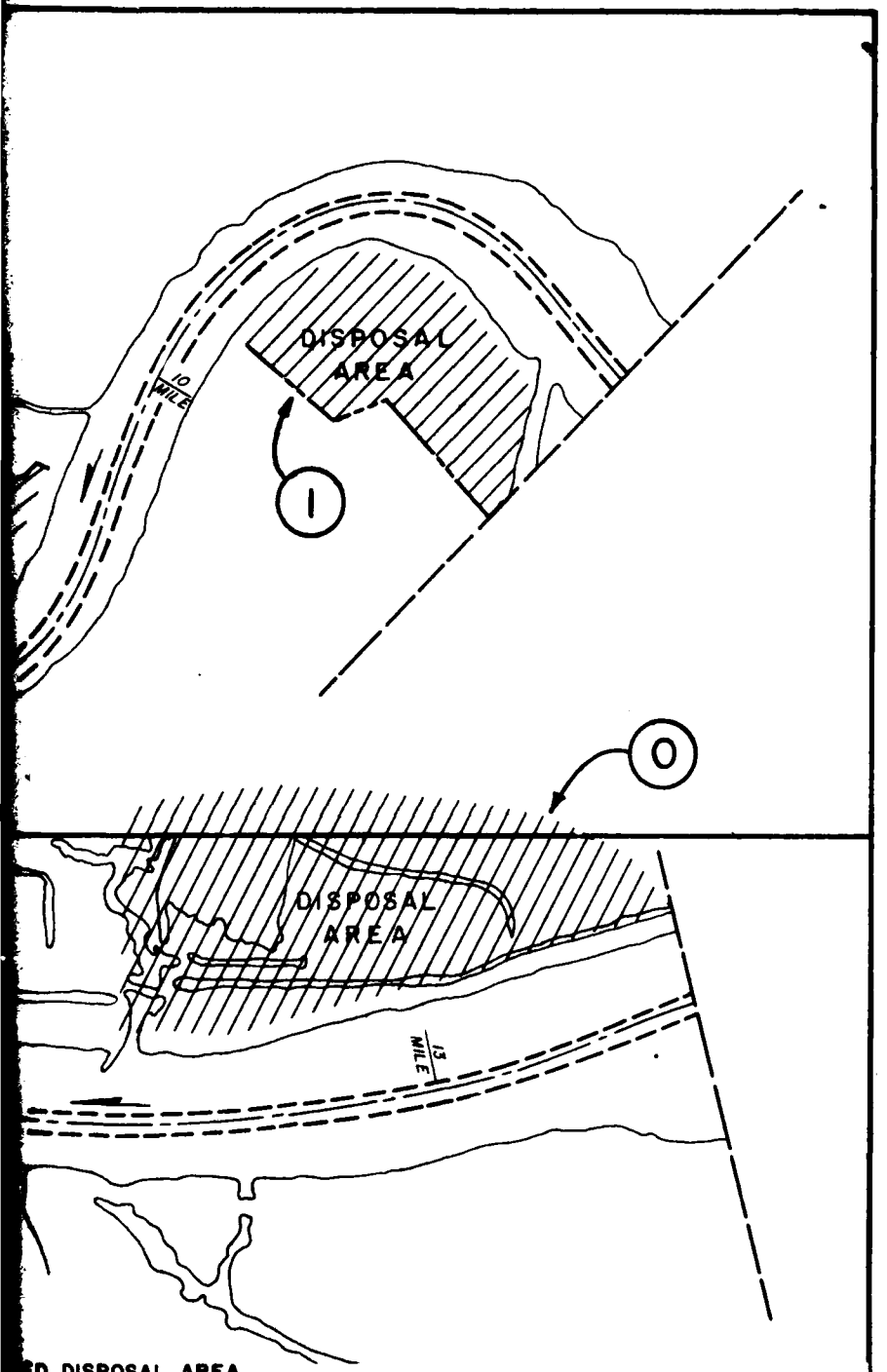
U. S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS

JULY 1978 FILE NO. H-2-26978

PLATE 4


D
DISPOSAL AREA
E
DISPOSAL AREA
MERMENTAU
MILE 10
F
DISPOSAL AREA
N
MILE 11
MERMENTAU
DISPOSAL
J
AREA
K
DISPOSAL
L


F
DISPOSAL AREA
MILE 9
G
H
DISPOSAL AREA
RIVER
10 MILE
I
N
DISPOSAL AREA
MILE 12
RIVER
AREA
M
L
LEGEND
PREVIOUSLY USED DISPOSAL AREA
EASEMENT BOUNDARY LINE
Scale in Feet
500 0 500 1000



ED DISPOSAL AREA
NDARY LINE

ENVIRONMENTAL STATEMENT
OPERATIONS AND MAINTENANCE OF FOUR PROJECTS
IN THE MERMENTAU BASIN, LOUISIANA

MERMENTAU RIVER, LA. PROJECT
DISPOSAL AREAS

U. S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS

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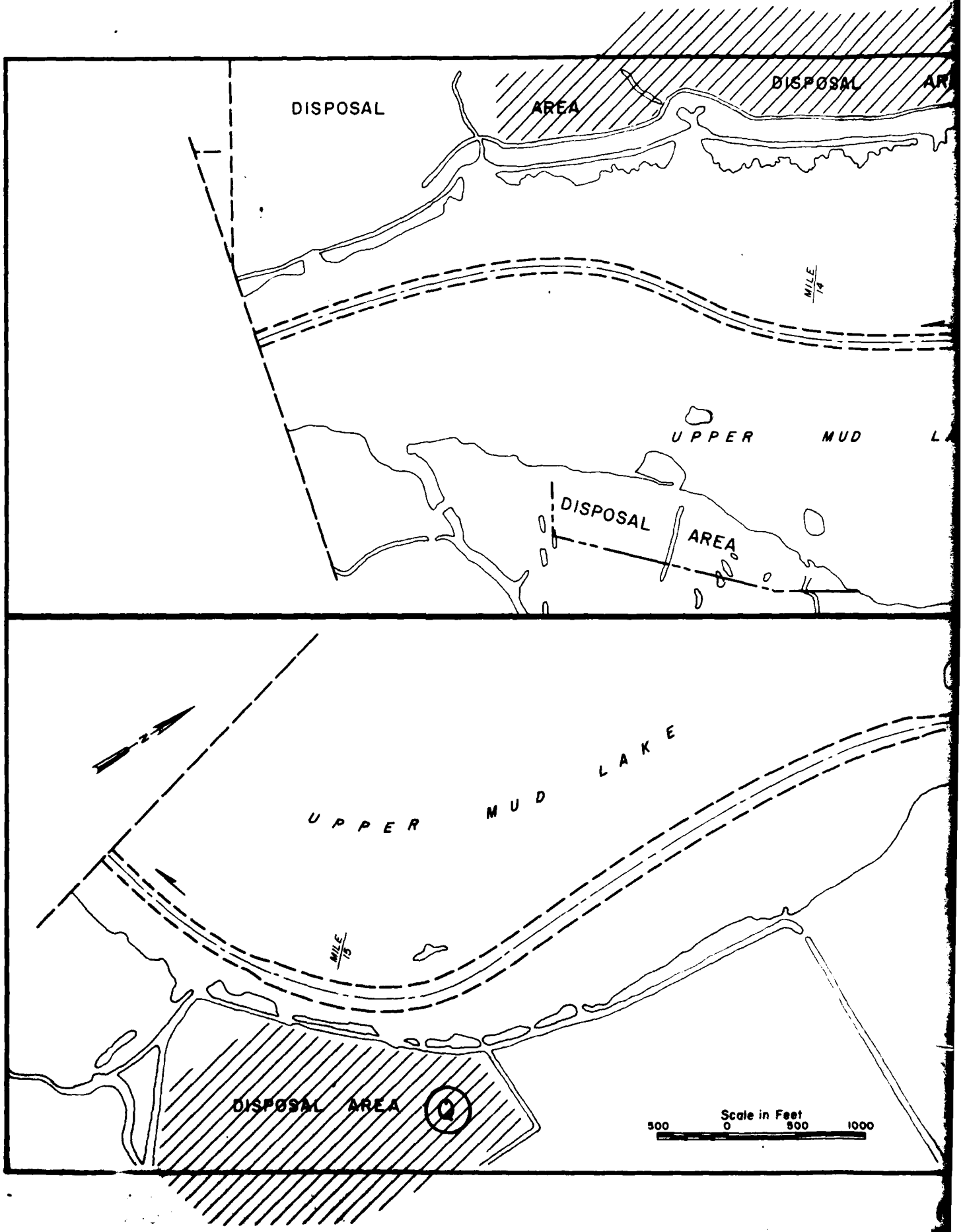
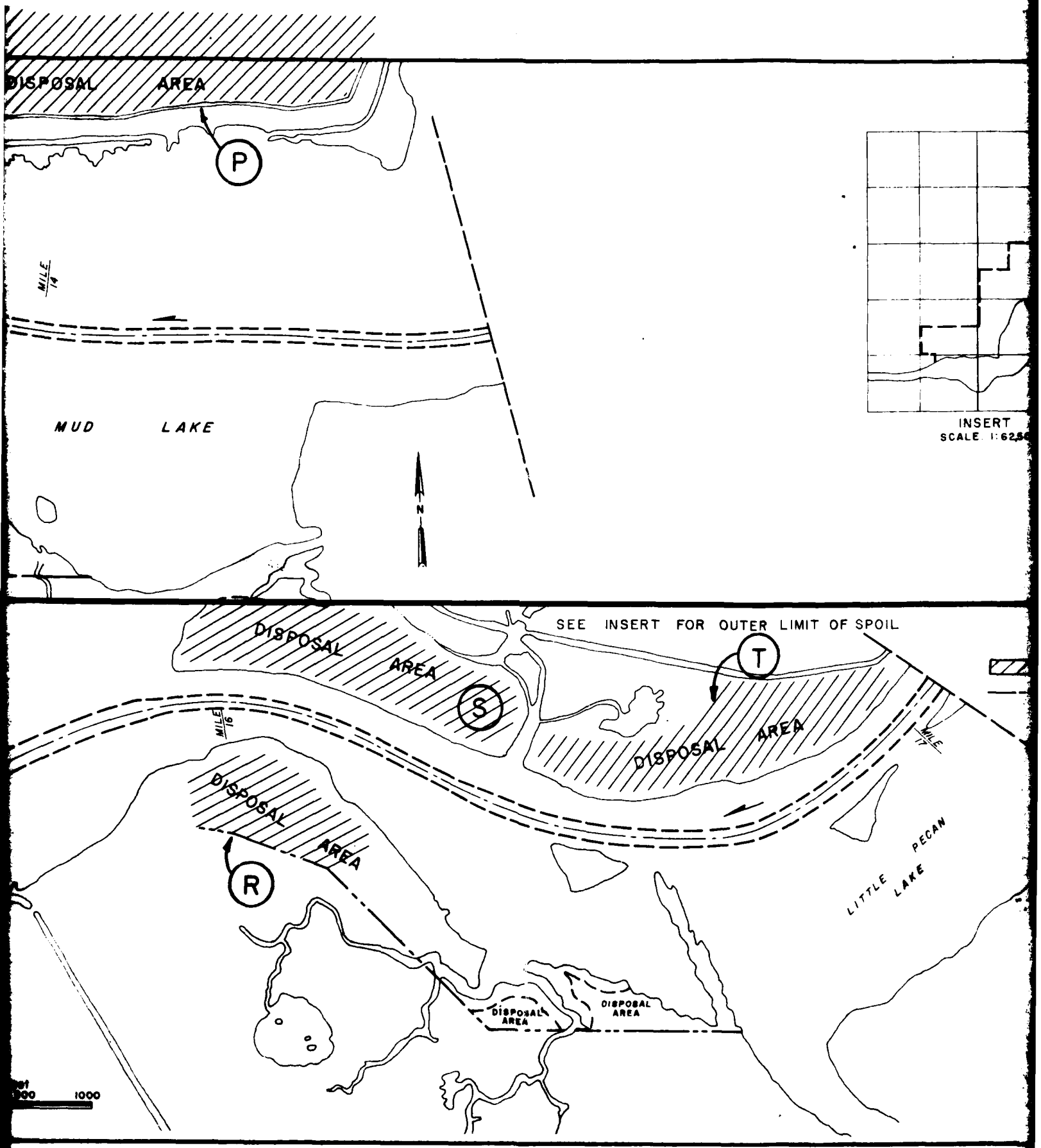
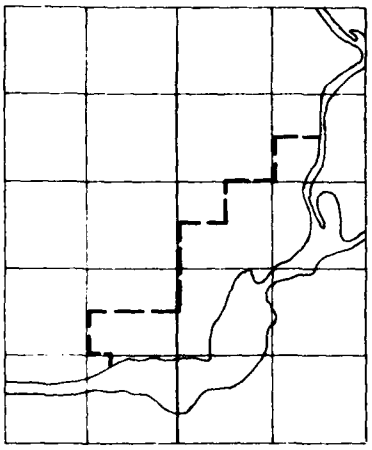
PLATE 5


DISPOSAL
AREA
DISPOSAL
AR
MILE 14
UPPER
MUD
L
DISPOSAL
AREA
UPPER MUD LAKE
MILE 13
DISPOSAL AREA
Q
Scale in Feet
500
0
500
1000


DISPOSAL AREA
P
MILE 14
MUD LAKE
N
INSERT
SCALE 1:62,5
SEE INSERT FOR OUTER LIMIT OF SPOIL
T
DISPOSAL AREA
S
MILE 16
DISPOSAL AREA
MILE 17
DISPOSAL AREA
R
LITTLE PECAN LAKE
DISPOSAL AREA
DISPOSAL AREA
1000



INSERT
SCALE: 1:62,500

OF SPOIL

LEGEND

PREVIOUSLY USED DISPOSAL AREA

EASEMENT BOUNDARY LINE

MILE 17

PECAN LAKE

LITTLE

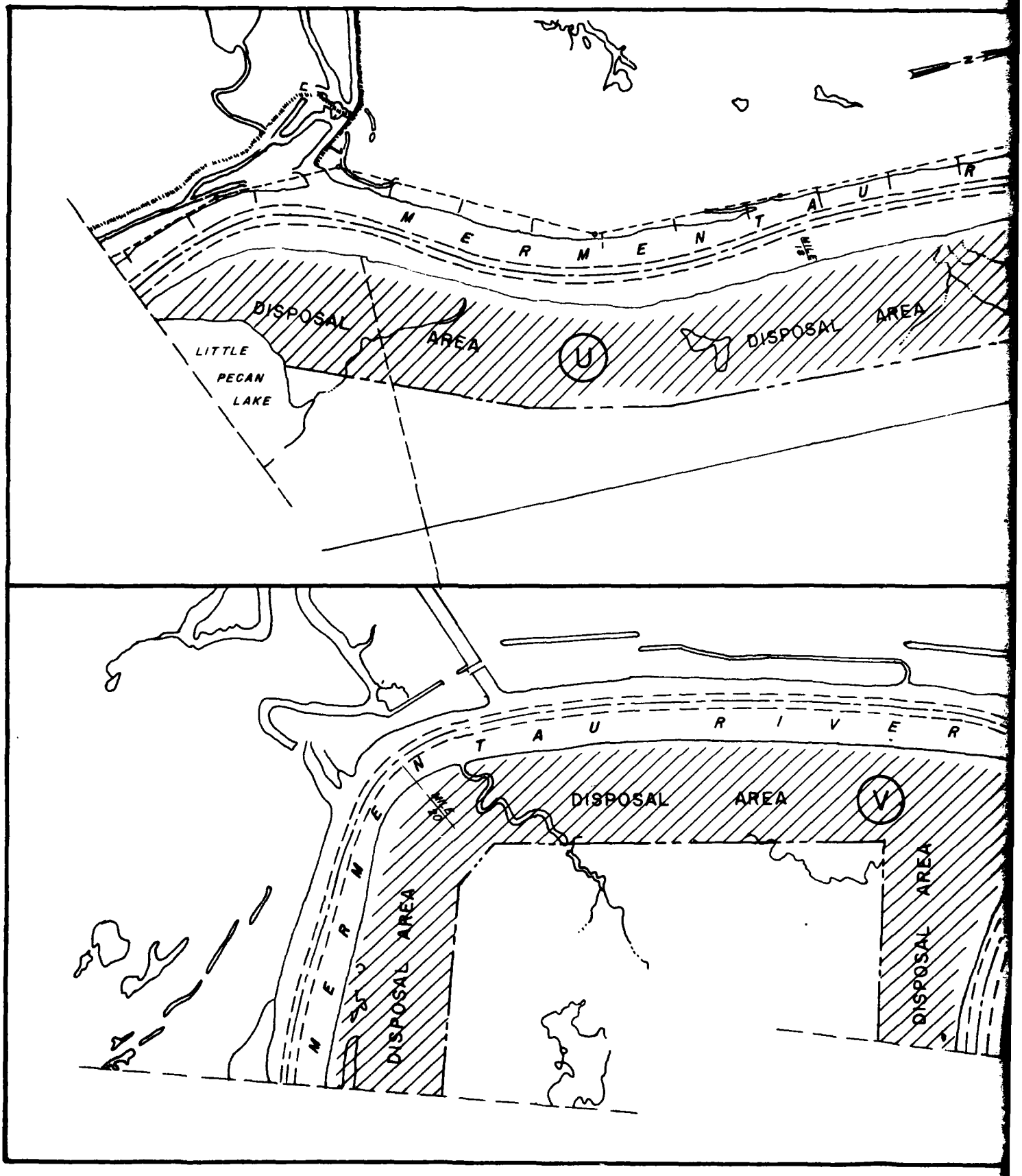
ENVIRONMENTAL STATEMENT
OPERATIONS AND MAINTENANCE OF FOUR PROJECTS
IN THE MERMENTAU BASIN, LOUISIANA

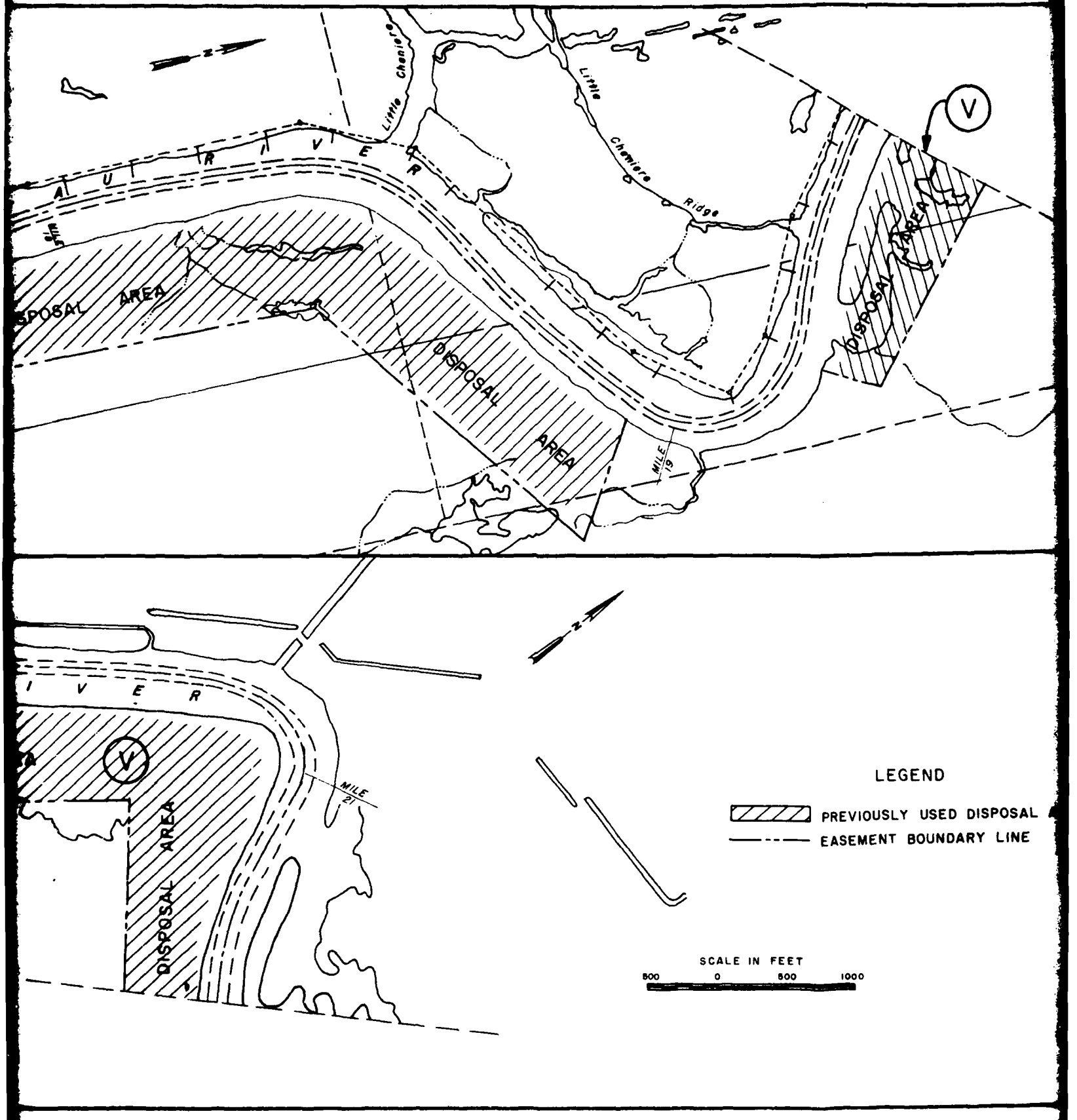
MERMENTAU RIVER, LA. PROJECT
DISPOSAL AREAS

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS

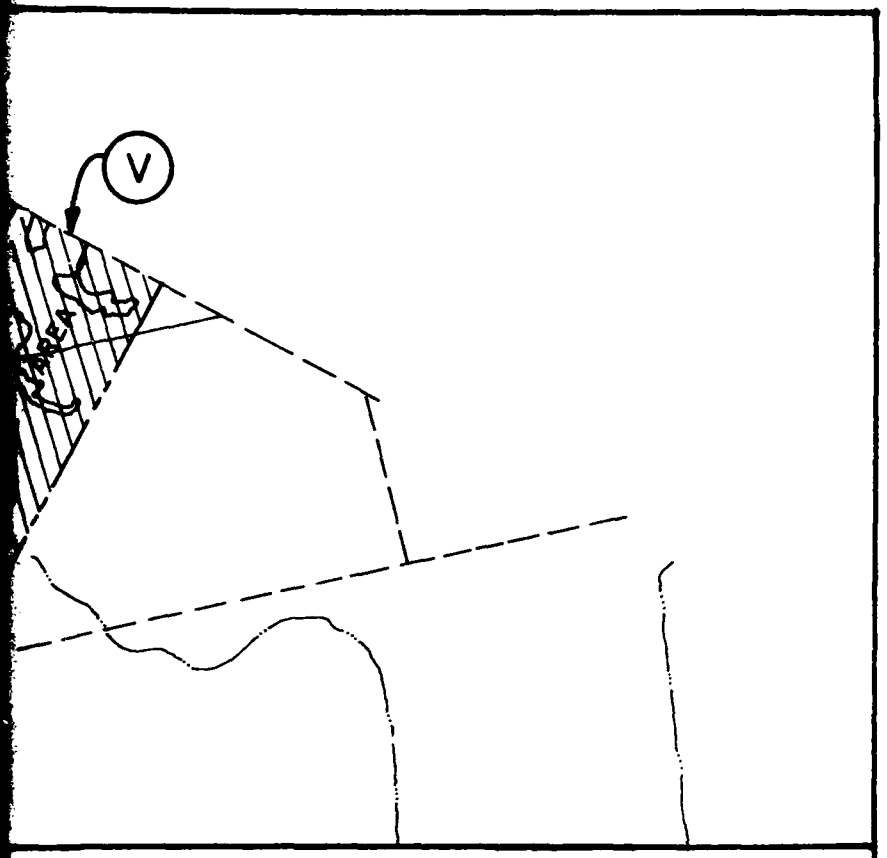
JULY 1978 FILE NO. H-2-26978

PLATE 6


M E R M E N T A U R
DISPOSAL AREA
LITTLE PECAN LAKE
U
DISPOSAL AREA
T A U R I V E R
N E R M E N T
DISPOSAL AREA
V
DISPOSAL AREA
DISPOSAL AREA


Little Chenière
Little Chenière Ridge
V
DISPOSAL AREA
MILE 19
MILE 21
LEGEND
PREVIOUSLY USED DISPOSAL
EASEMENT BOUNDARY LINE
SCALE IN FEET
500 0 500 1000

.2



GEND

Y USED DISPOSAL AREA
BOUNDARY LINE

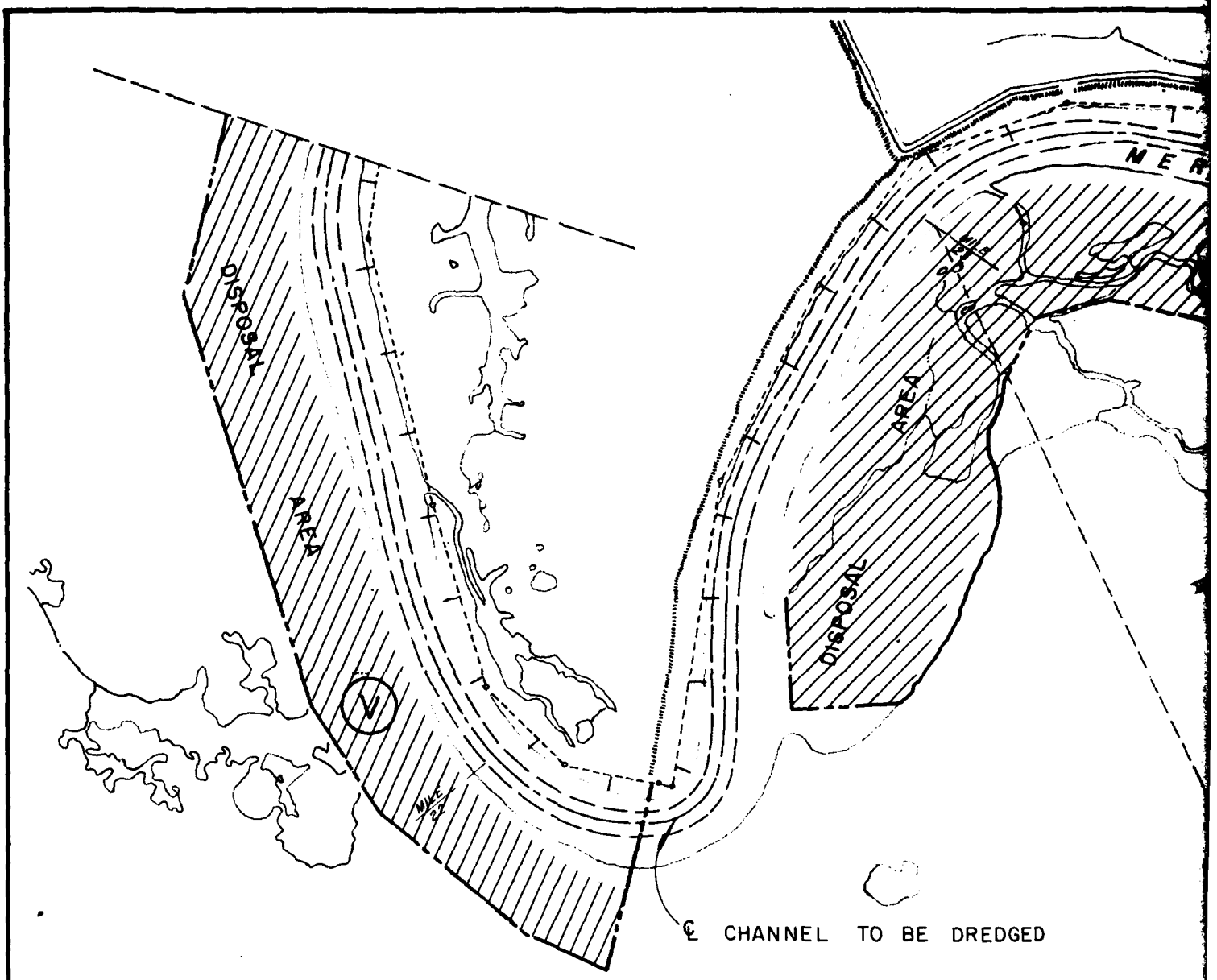
ENVIRONMENTAL STATEMENT
OPERATIONS AND MAINTENANCE OF FOUR PROJECTS
IN THE MERMENTAU BASIN, LOUISIANA

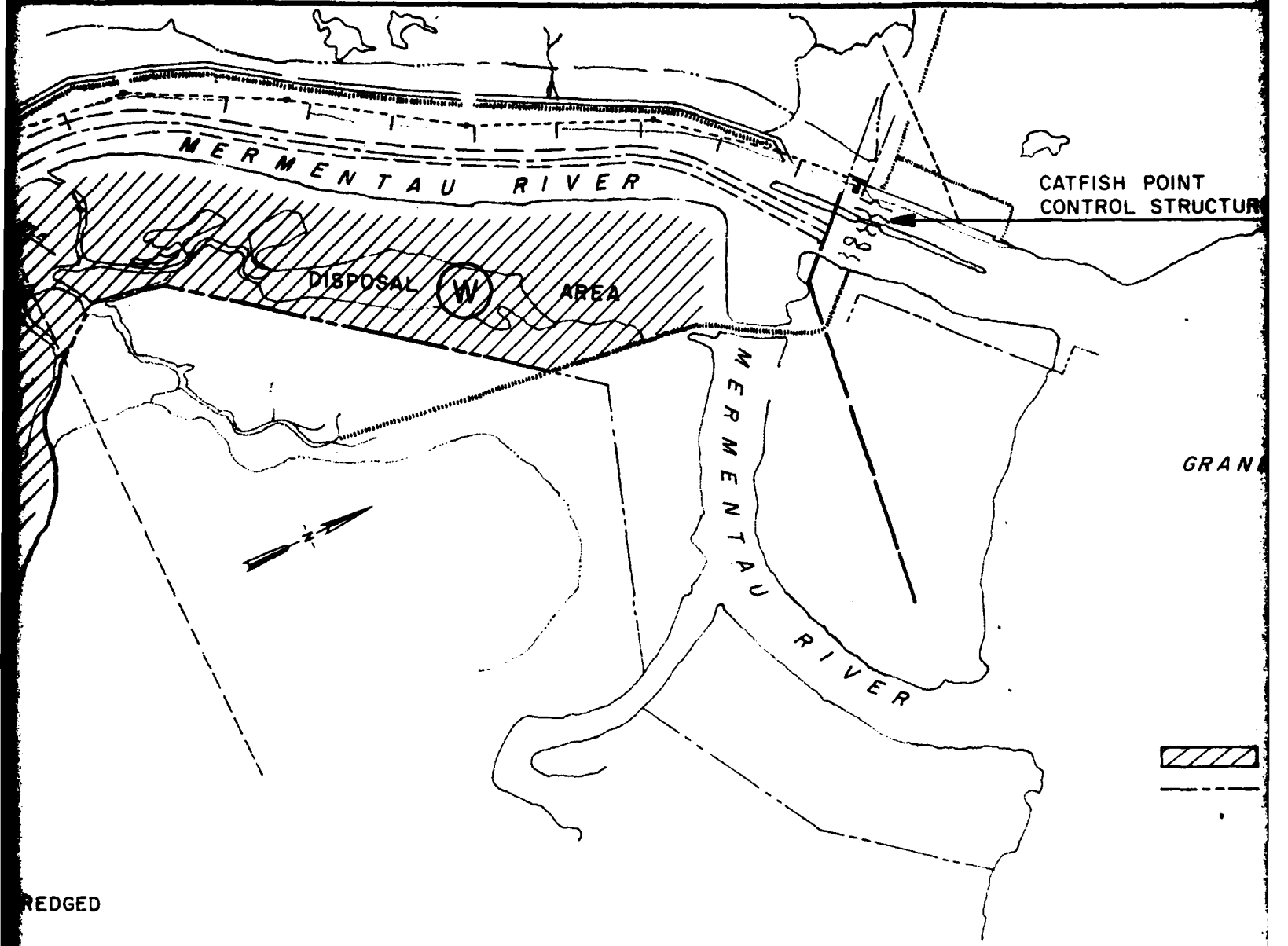
MERMENTAU RIVER, LA. PROJECT
DISPOSAL AREAS

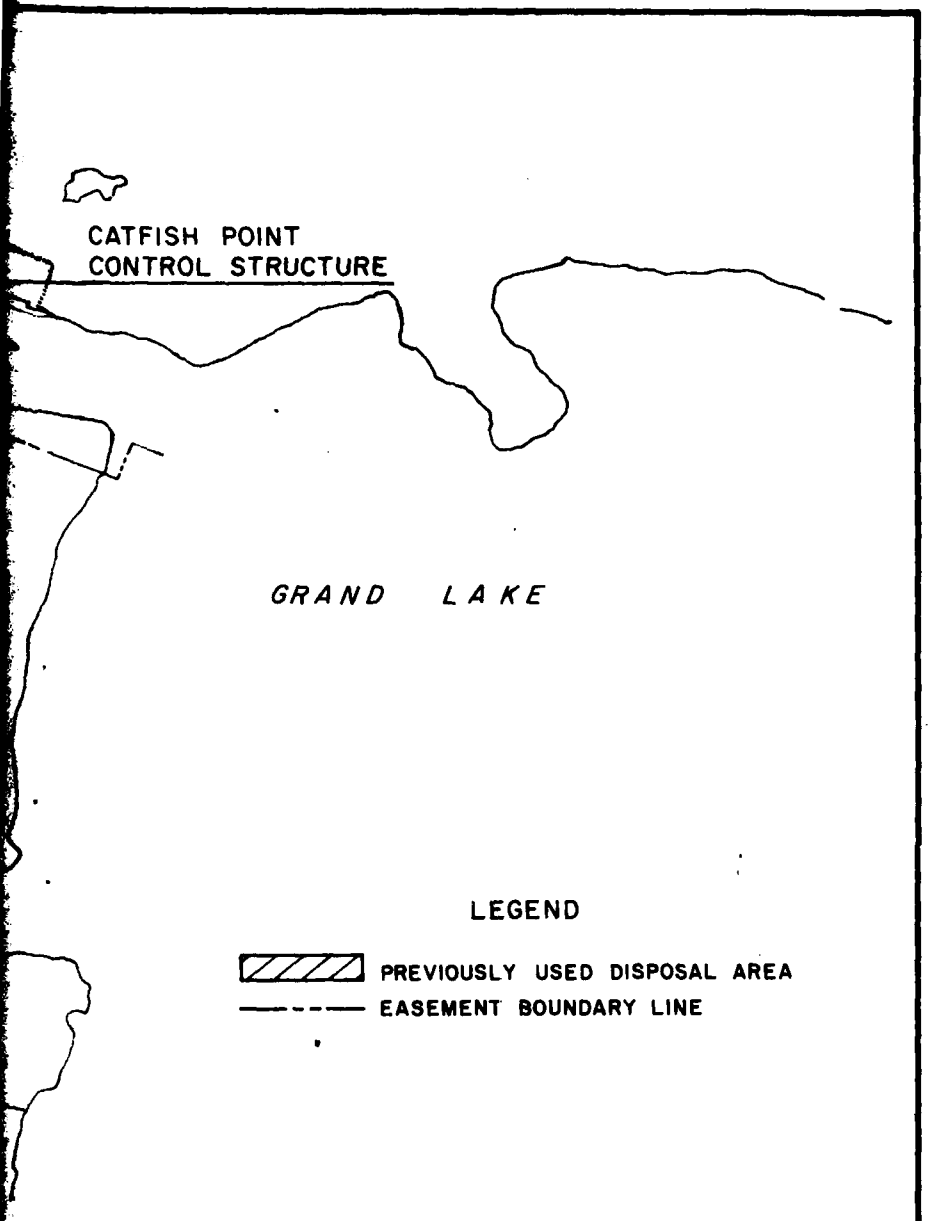
U. S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS

JULY 1978 FILE NO. H-2-26978

PLATE 7


DISPOSAL
AREA
DISPOSAL
AREA
MILE
2.7
℄ CHANNEL TO BE DREDGED


MERMENTAU RIVER
CATFISH POINT
CONTROL STRUCTUR
DISPOSAL
W
AREA
MERMENTAU RIVER
GRAN
REDGED
SCALE IN FEET
500
0
500
1000



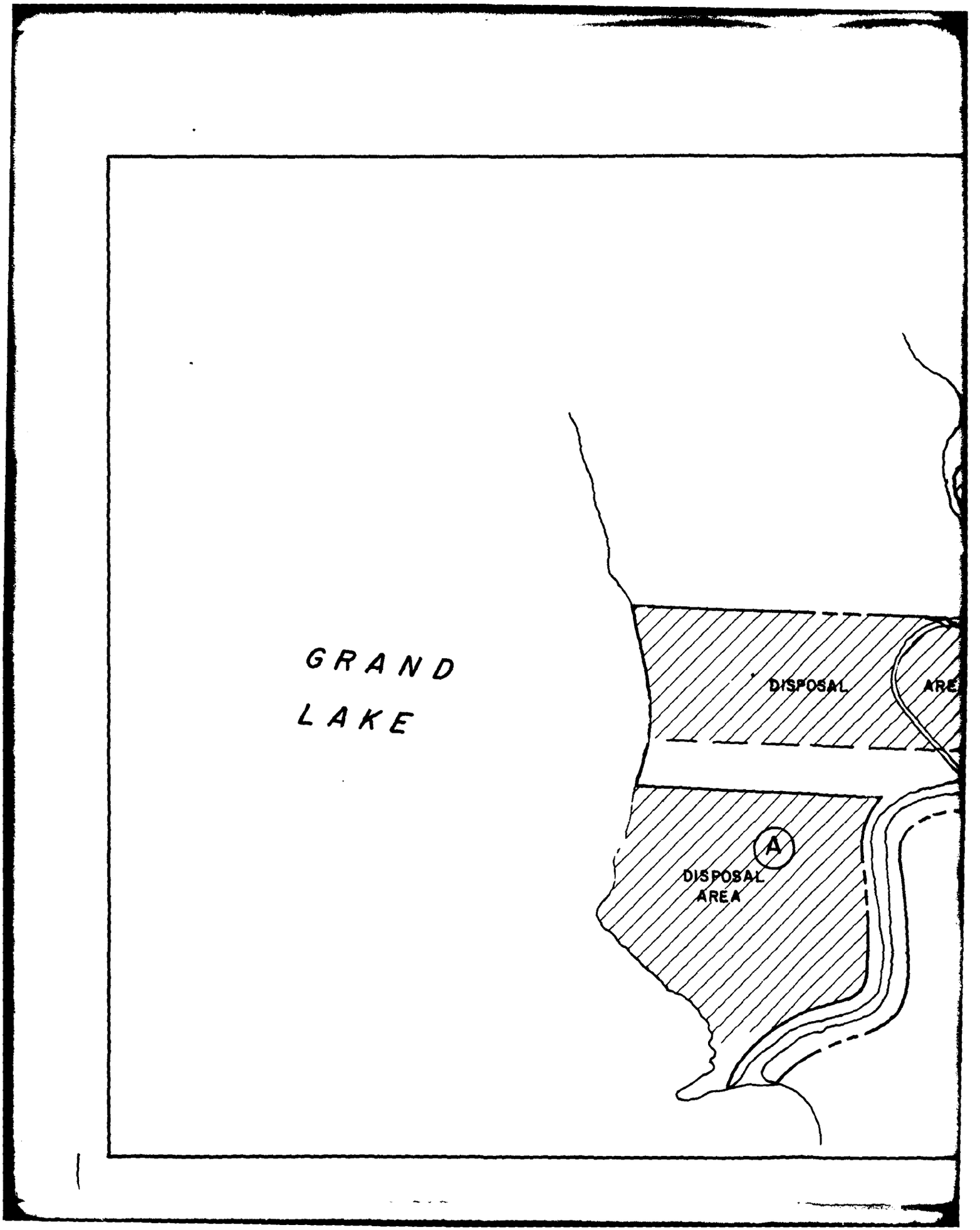
ENVIRONMENTAL STATEMENT
OPERATIONS AND MAINTENANCE OF FOUR PROJECTS
IN THE MERMENTAU BASIN, LOUISIANA

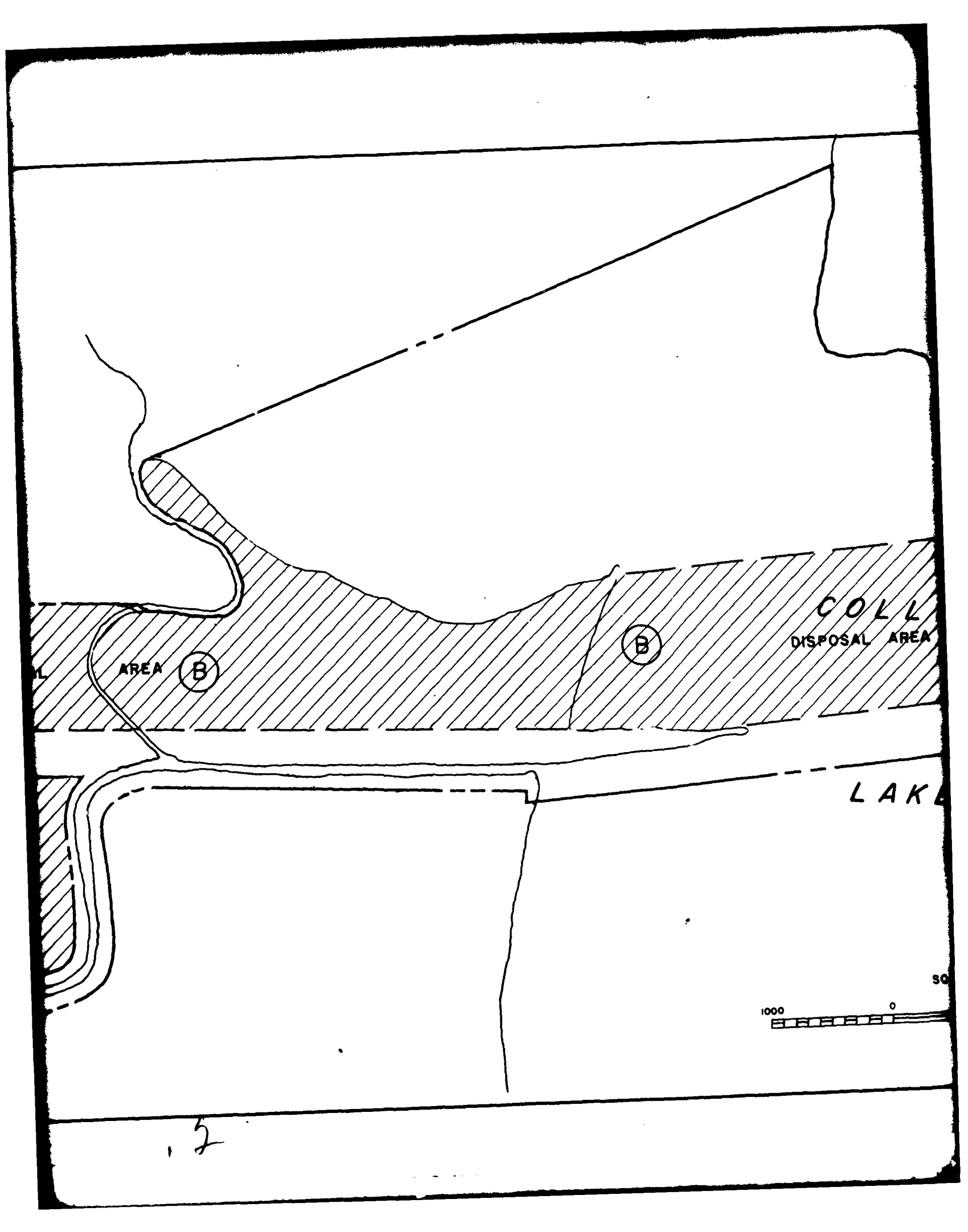
MERMENTAU RIVER, LA. PROJECT
DISPOSAL AREAS

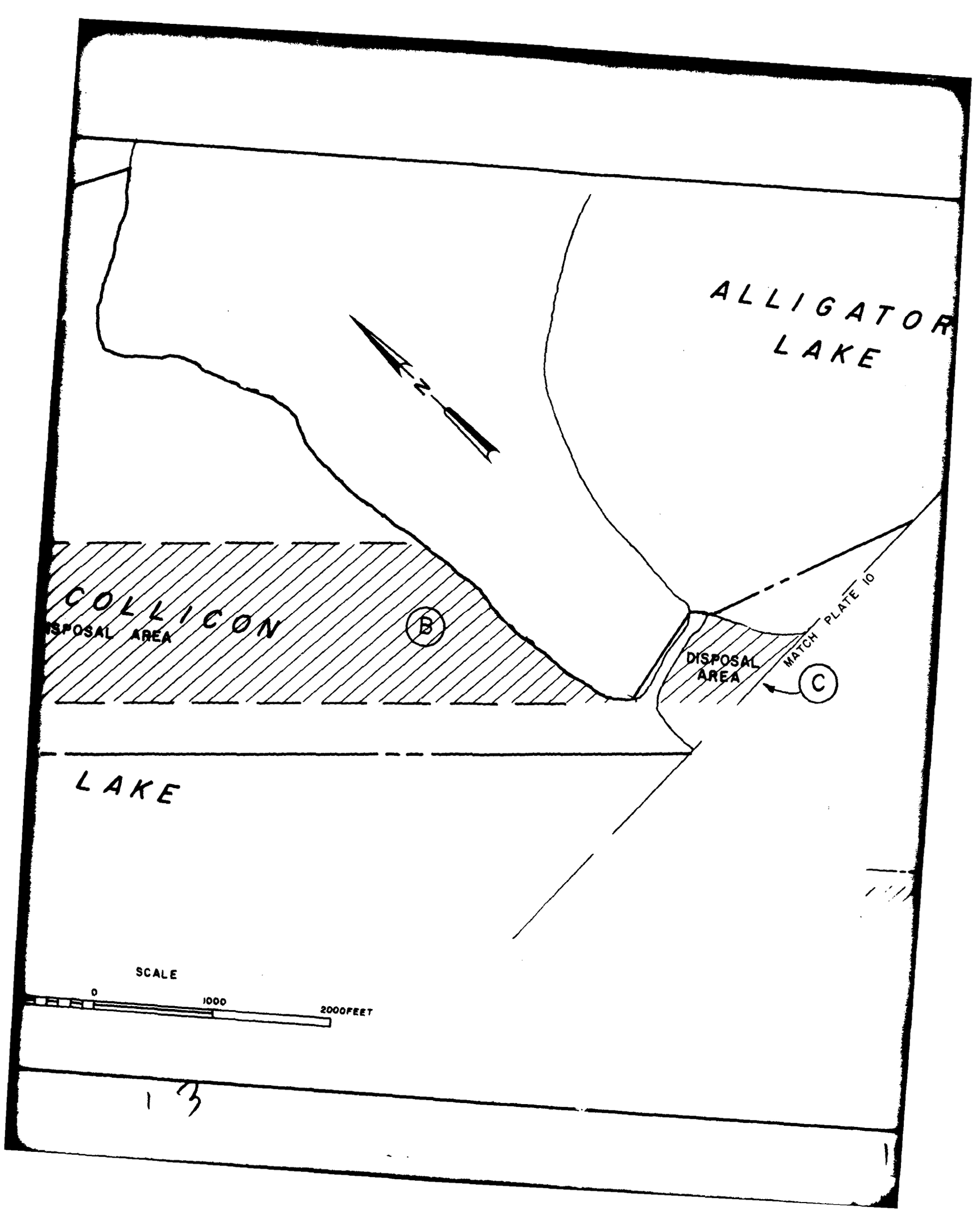
U. S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS

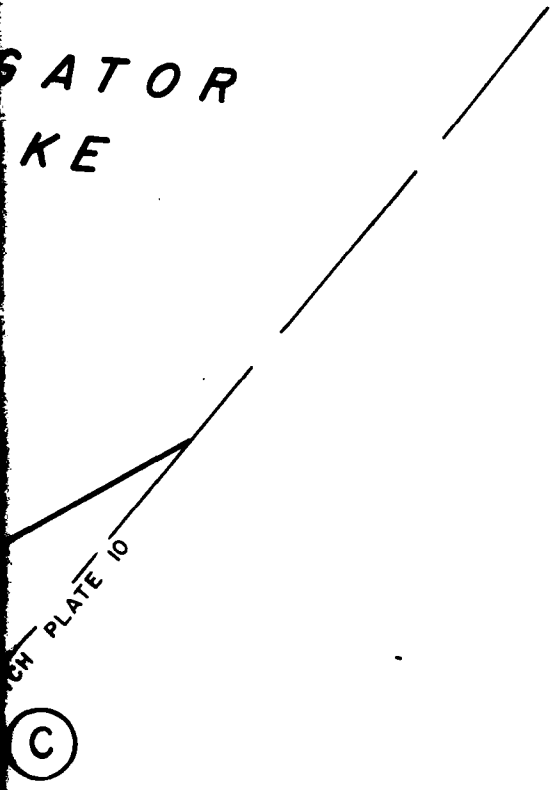
JULY 1978 FILE NO. H-2-26978

PLATE 8


GRAND
LAKE
DISPOSAL
A
DISPOSAL
AREA


AREA
B
B
DISPOSAL AREA
1000
0


ALLIGATOR
LAKE
N
COLLICON
DISPOSAL AREA
B
DISPOSAL
AREA
MATCH PLATE 10
C
LAKE
SCALE
0
1000
2000FEET



LEGEND

——— EASEMENT LINE

PREVIOUSLY USED DISPOSAL AREA

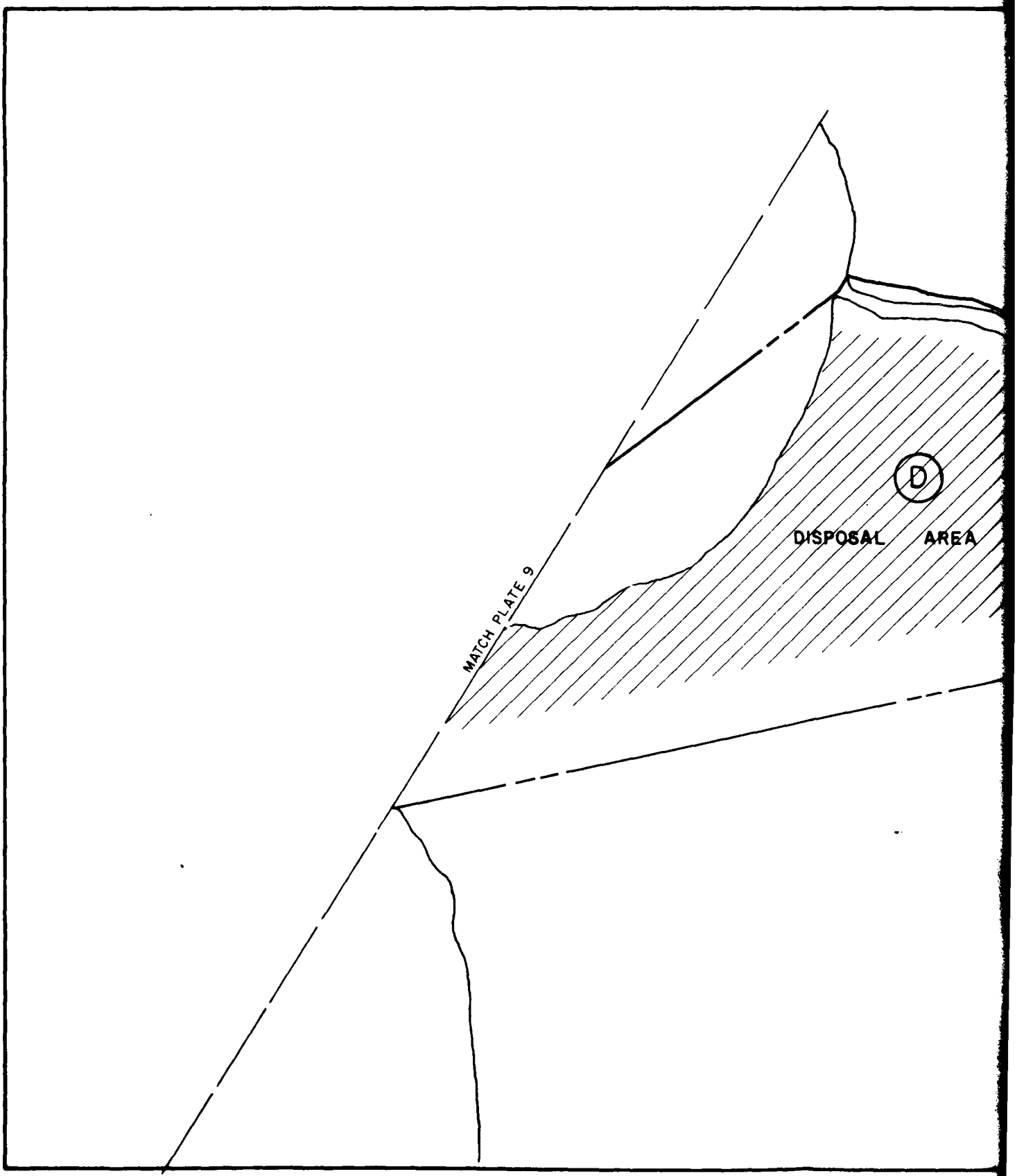
ENVIRONMENTAL STATEMENT
OPERATIONS AND MAINTENANCE OF FOUR PROJECTS
IN THE MERMENTAU BASIN, LOUISIANA

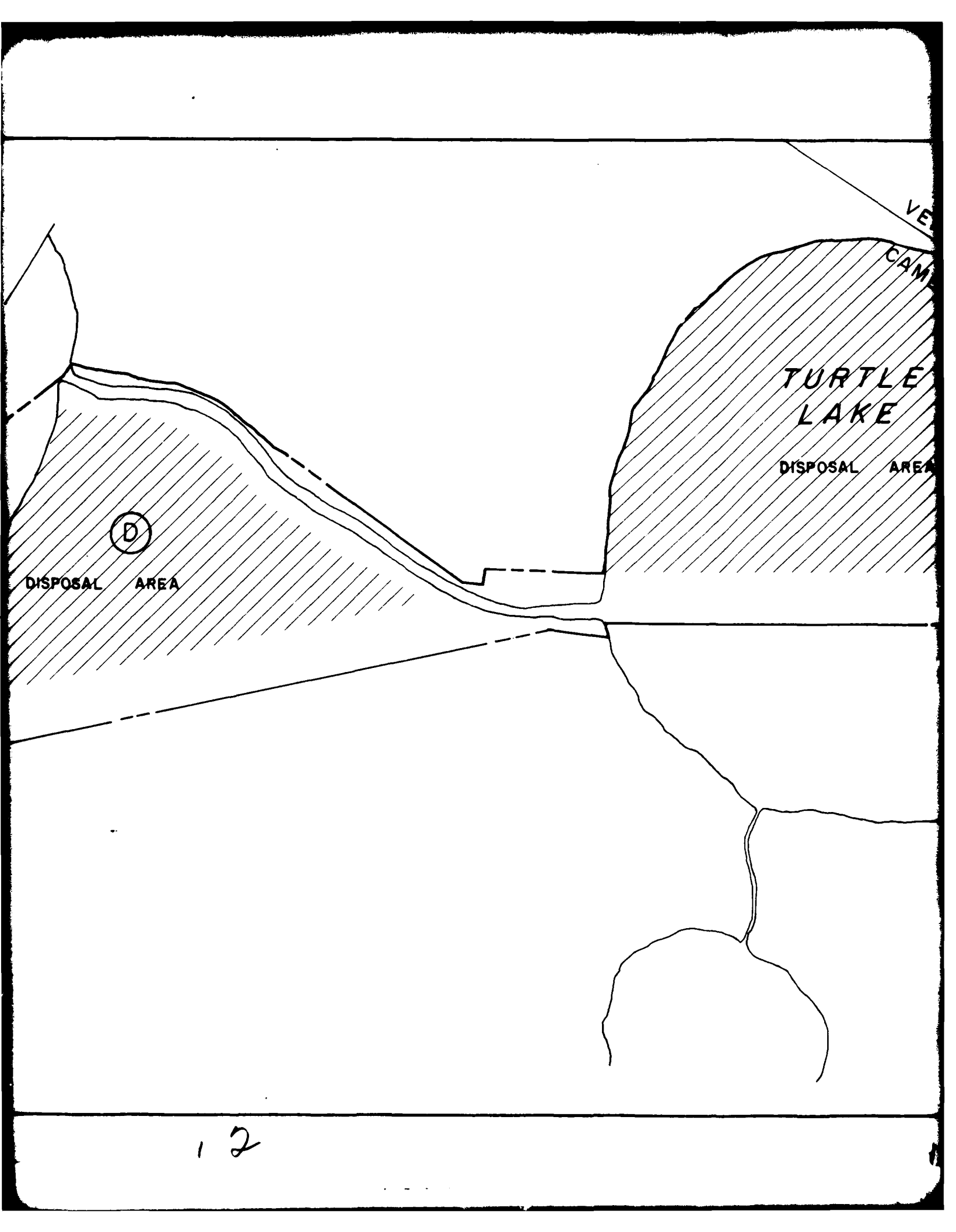
MERMENTAU RIVER, LA. PROJECT
DISPOSAL AREAS

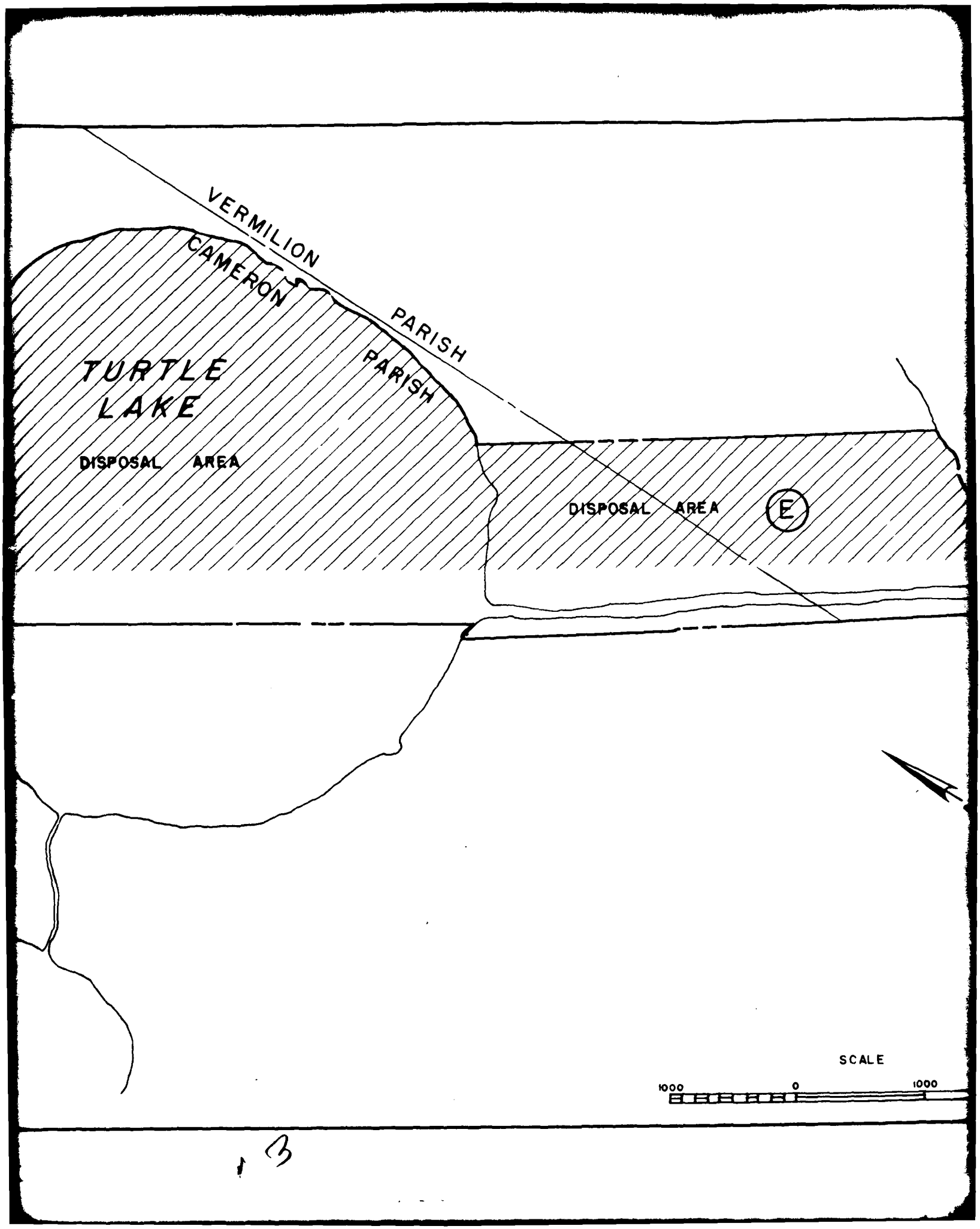
U. S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS

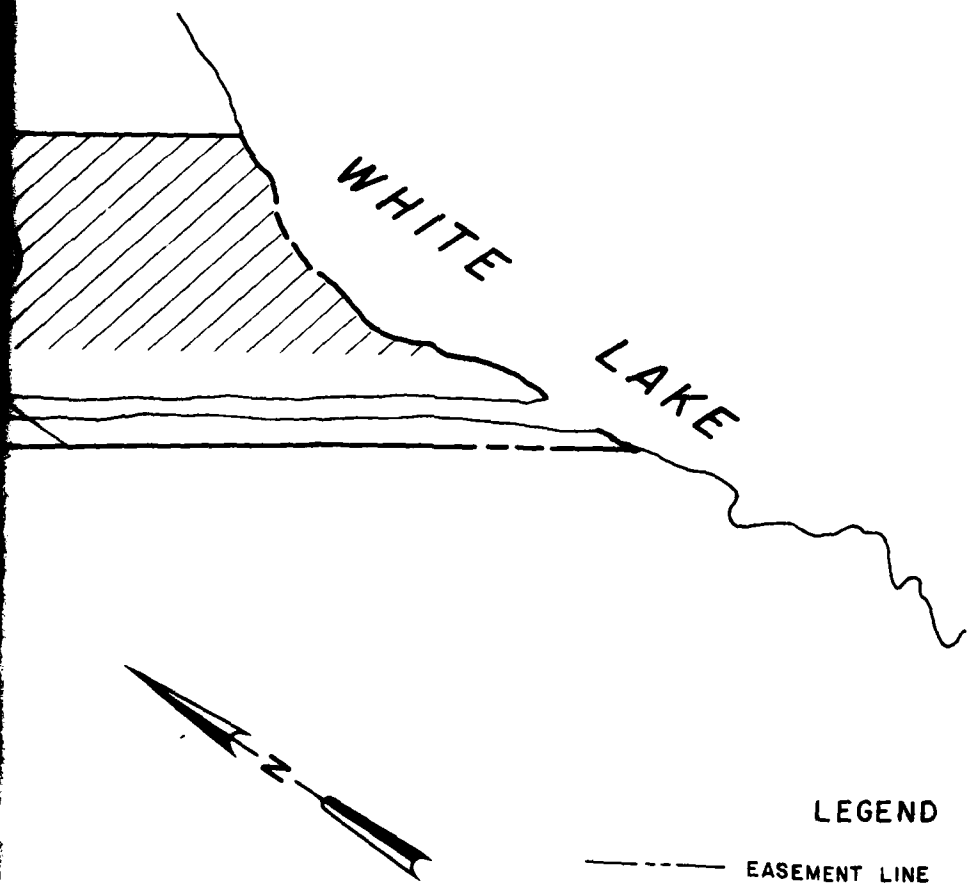
JULY 1978 FILE NO. H-2-26978

PLATE 9


D
DISPOSAL AREA
MATCH PLATE 9


VE
CAM
TURTLE
LAKE
DISPOSAL AREA
D
DISPOSAL AREA


VERMILION
PARISH
CAMERON
PARISH
TURTLE
LAKE
DISPOSAL AREA
DISPOSAL AREA
E
SCALE
1000
0
1000



LEGEND

EASEMENT LINE

PREVIOUSLY USED DISPOSAL AREA

SCALE

1000 2000 FEET

ENVIRONMENTAL STATEM
OPERATIONS AND MAINTENANCE OF P
IN THE MERMENTAU BASIN, LOU

MERMENTAU RIVER, LA.
DISPOSAL AREA

U S. ARMY ENGINEER DISTRICT, NO
CORPS OF ENGINEERS

JULY 1978

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ENVIRONMENTAL STATEMENT
OPERATIONS AND MAINTENANCE OF FOUR PROJECTS
IN THE MERMENTAU BASIN, LOUISIANA

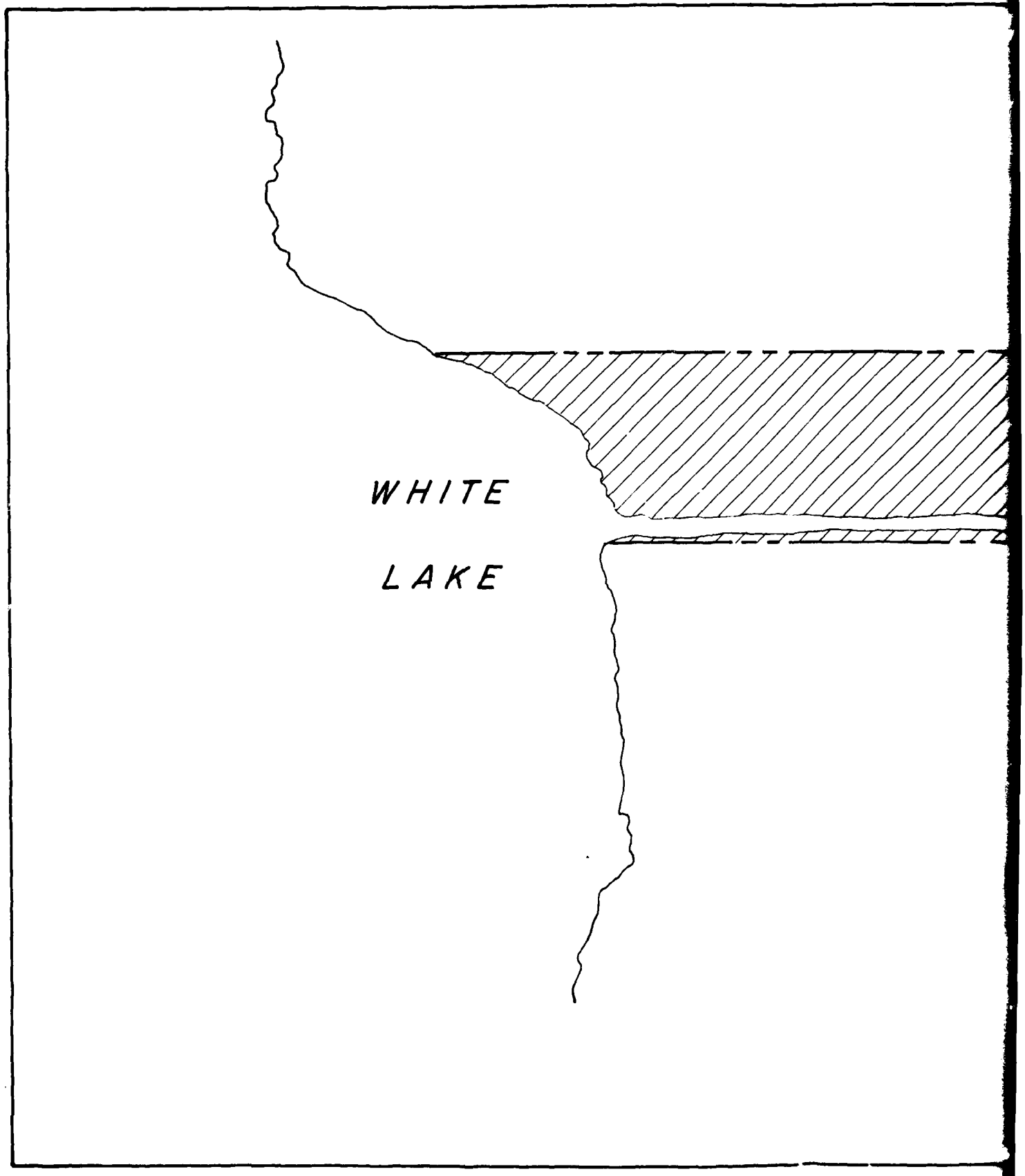
MERMENTAU RIVER, LA. PROJECT
DISPOSAL AREAS

U. S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS

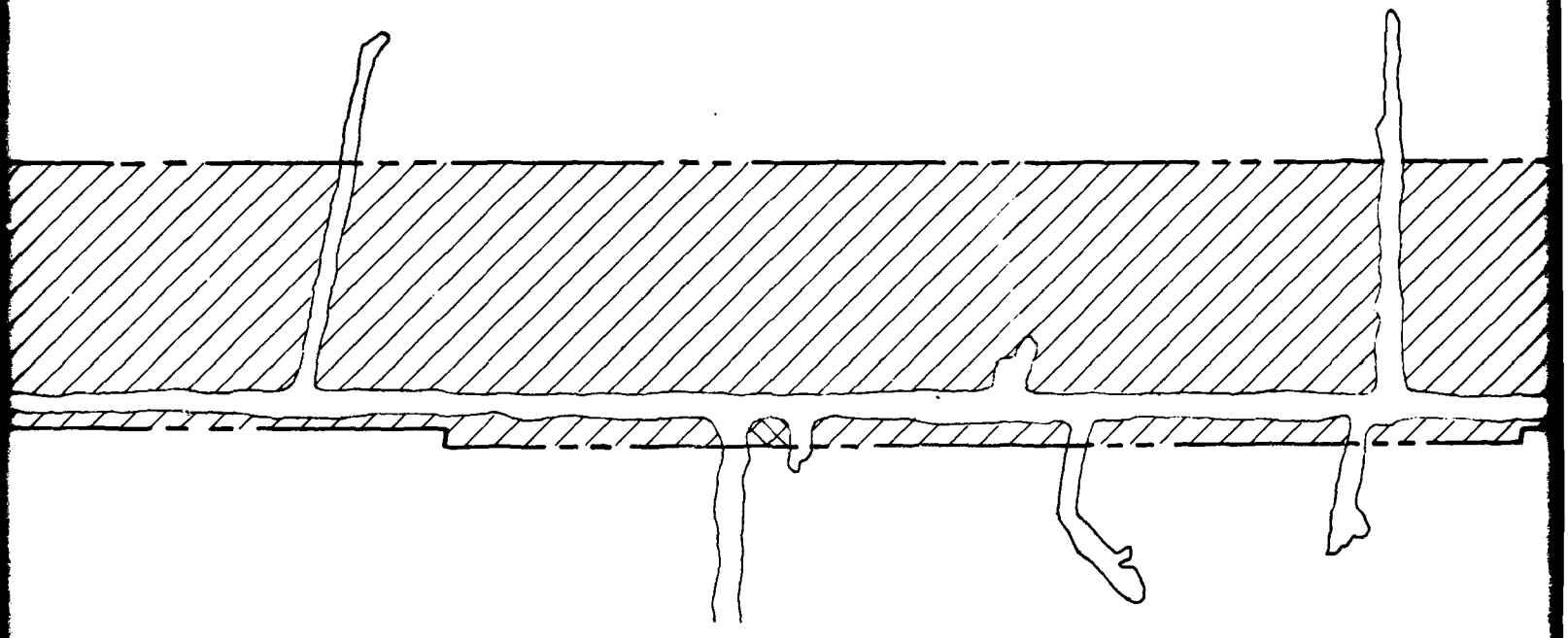
JULY 1978 FILE NO. H-2-26978

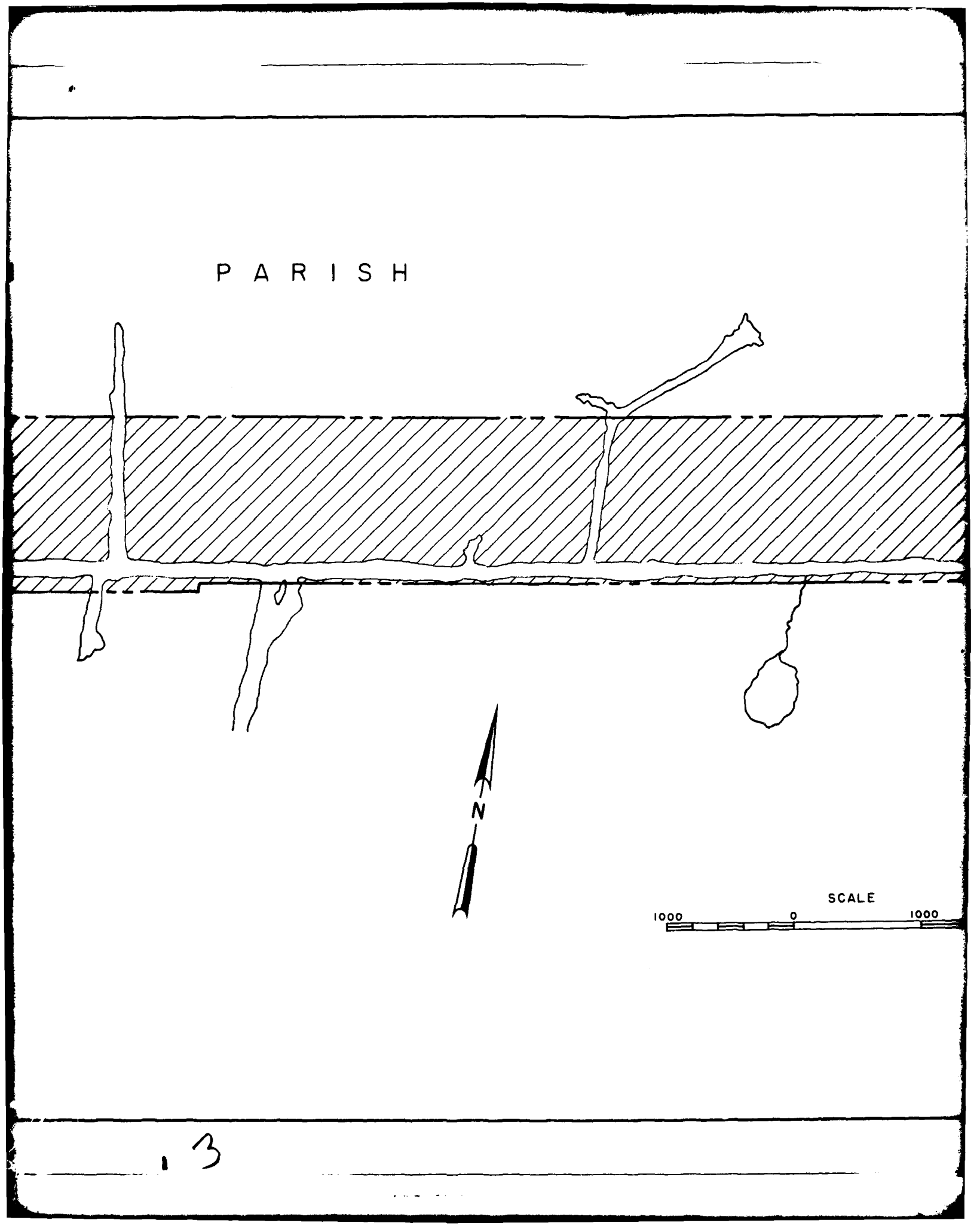
PLATE 10

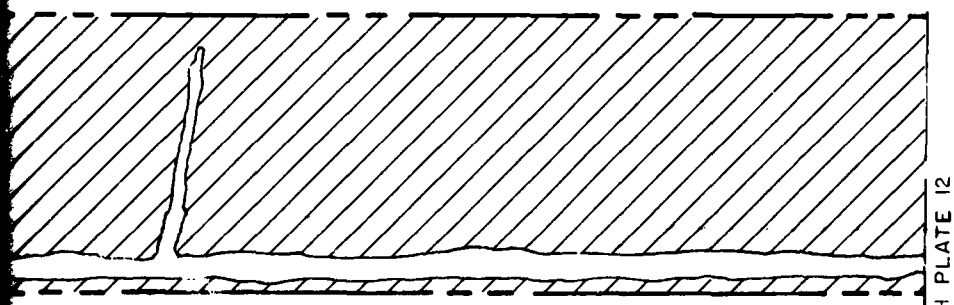
1 5


WHITE
LAKE

V E R M I L I O N




PARISH
N
SCALE
1000
0
1000



MATCH PLATE 12

1000 2000 FEET

LEGEND

EASEMENT LINE

PREVIOUSLY USED DISPOSAL AREA

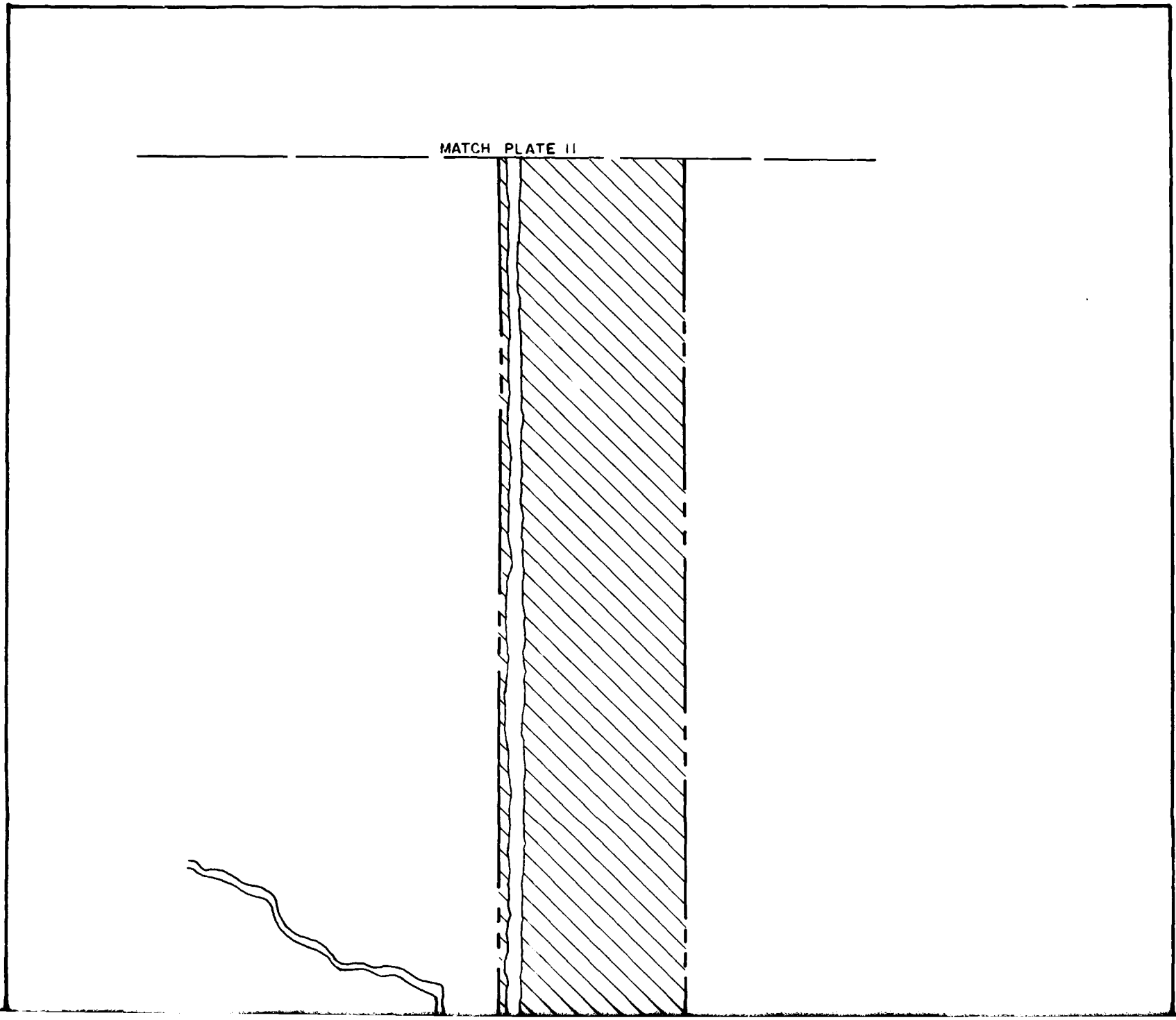
ENVIRONMENTAL STATEMENT
OPERATIONS AND MAINTENANCE OF FOUR PROJECTS
IN THE MERMENTAU BASIN, LOUISIANA

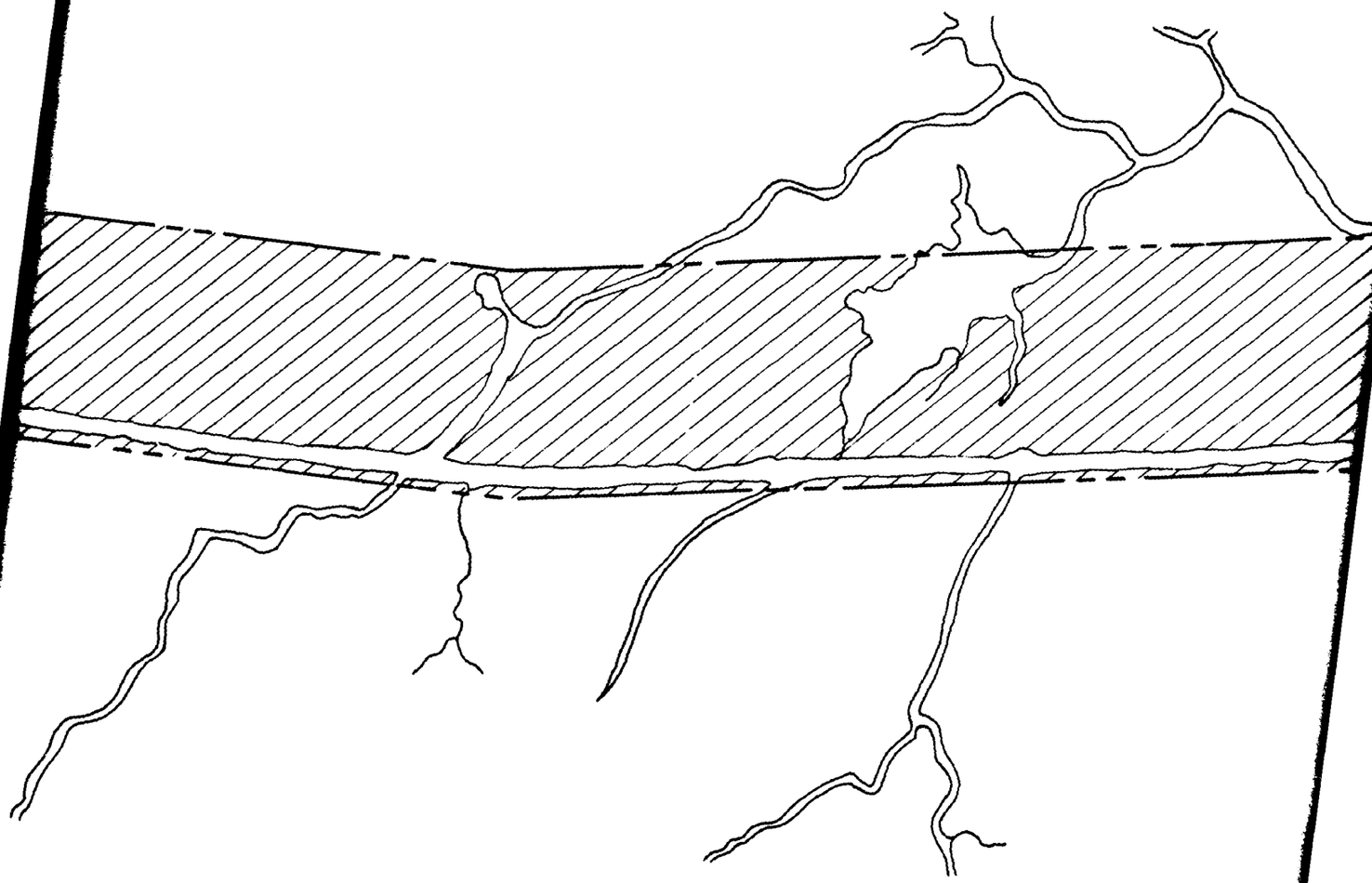
MERMENTAU RIVER, LA. PROJECT
DISPOSAL AREAS

U. S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS

JULY 1978 FILE NO. H-2-26978

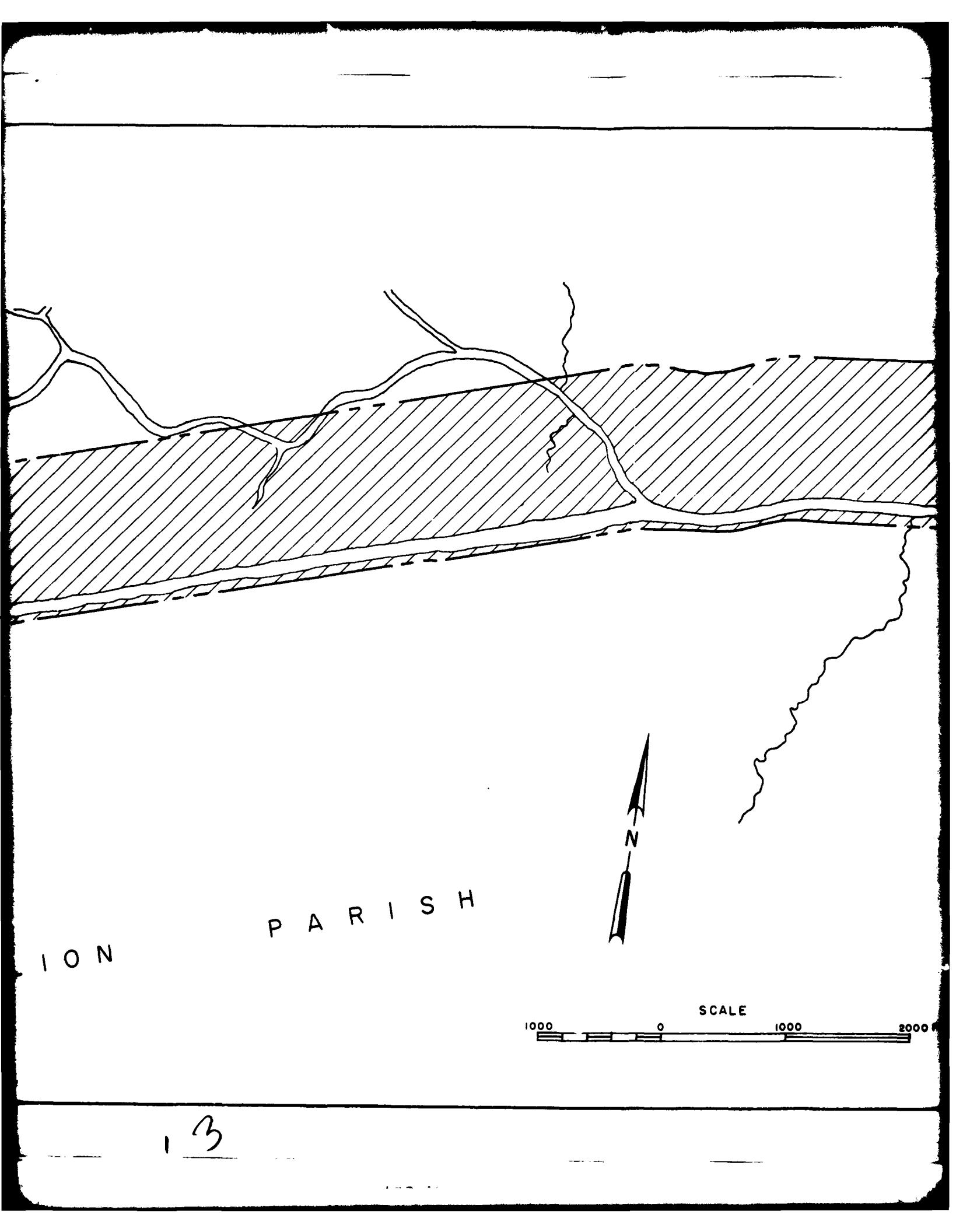
PLATE 11

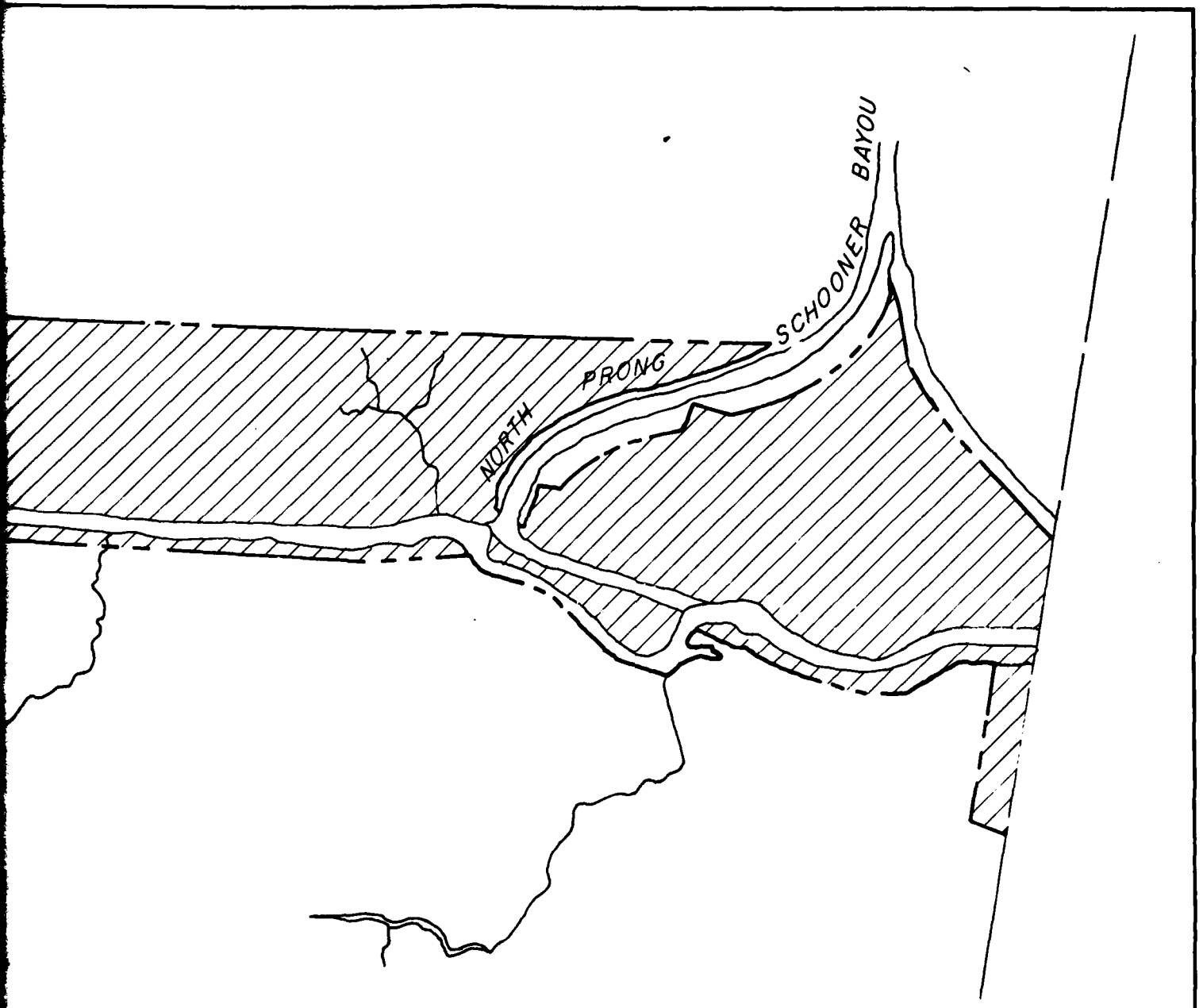

MATCH PLATE II



VERMILION

12


N
P A R I S H
I O N
SCALE
1000
0
1000
2000



LEGEND

EASEMENT LINE

PREVIOUSLY USED DISPOSAL AREA

2000 FEET

ENVIRONMENTAL STATEMENT
OPERATIONS AND MAINTENANCE OF FOUR PROJECTS
IN THE MERMENTAU BASIN, LOUISIANA

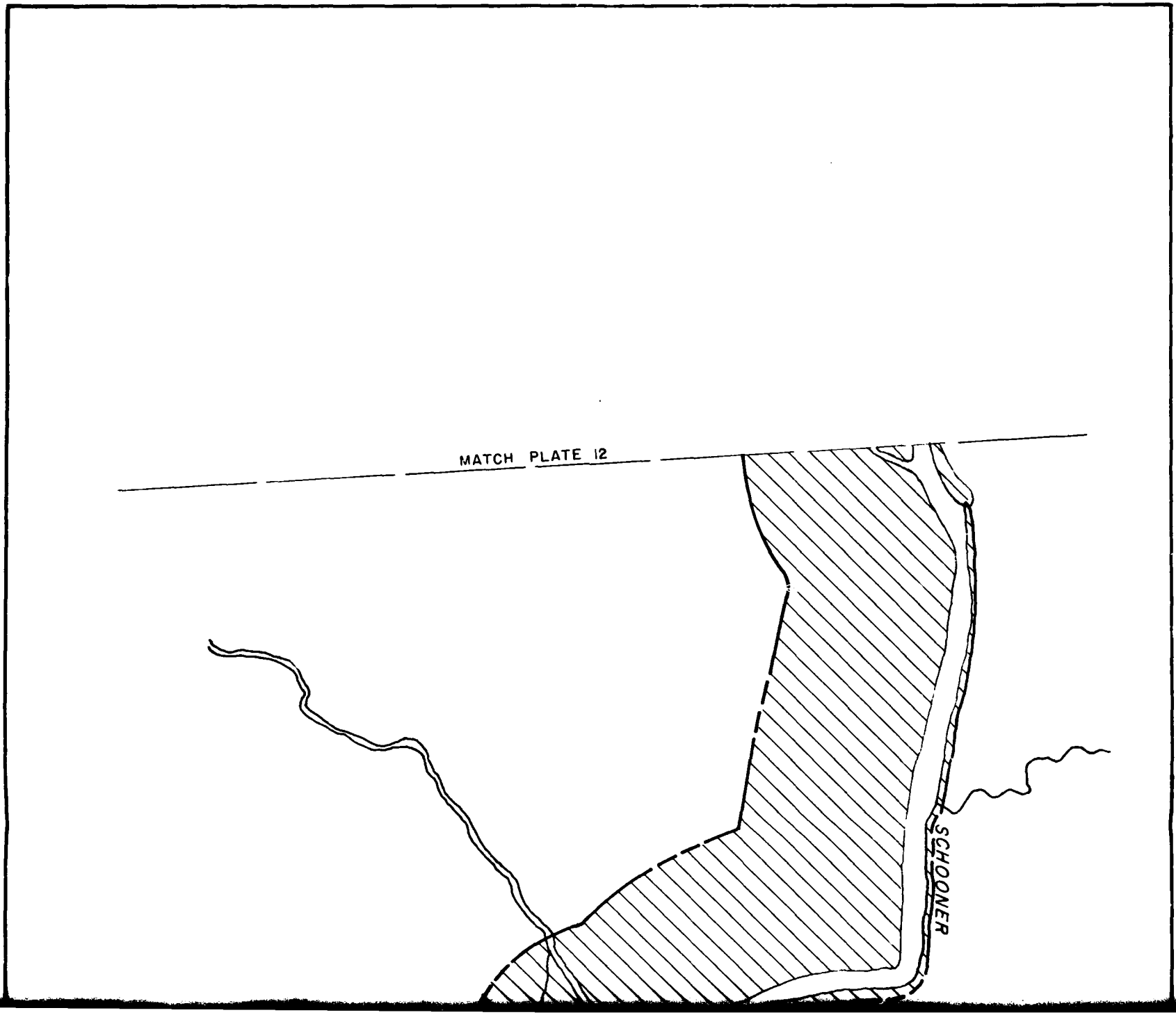
MERMENTAU RIVER, LA. PROJECT
DISPOSAL AREAS

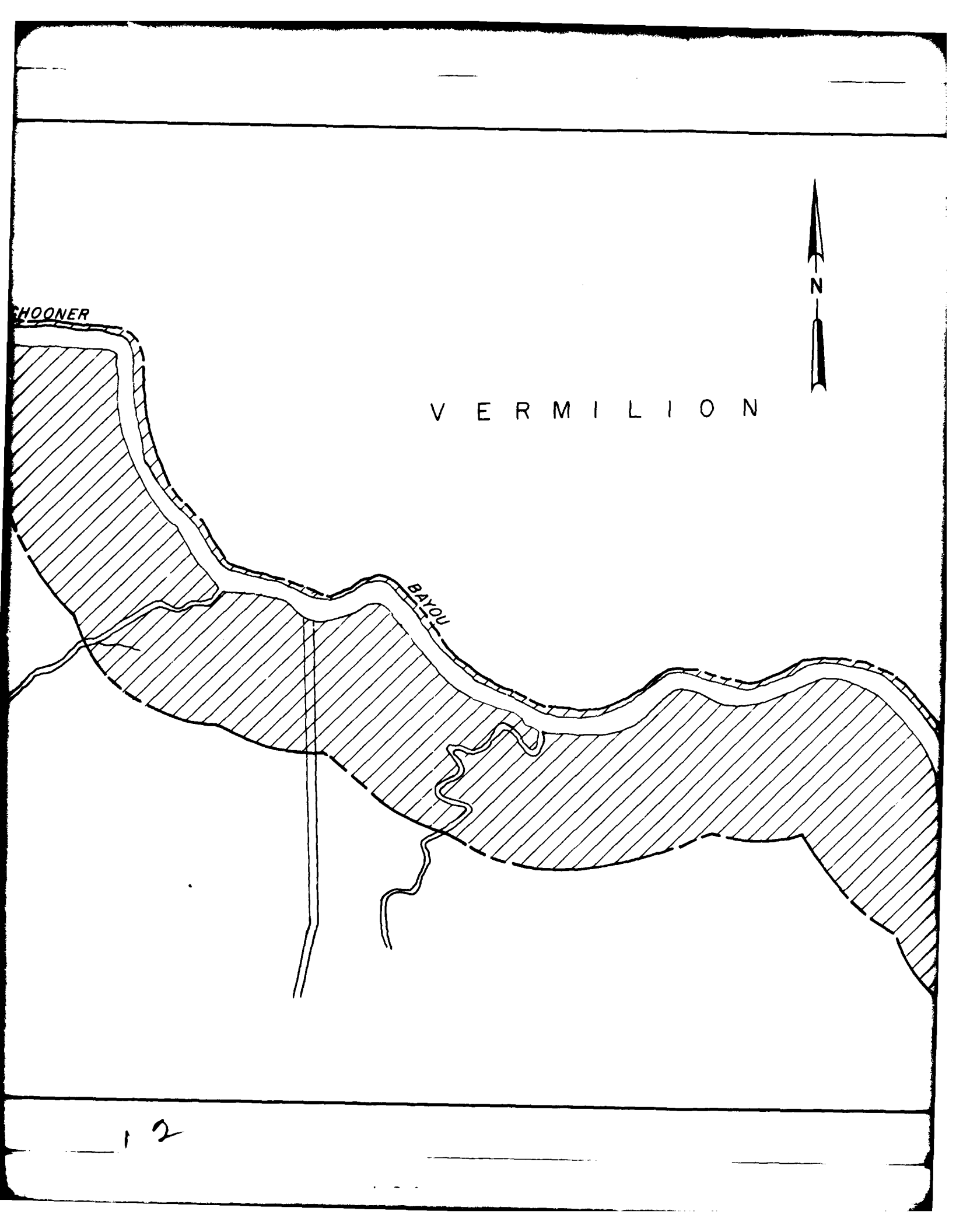
U S ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS

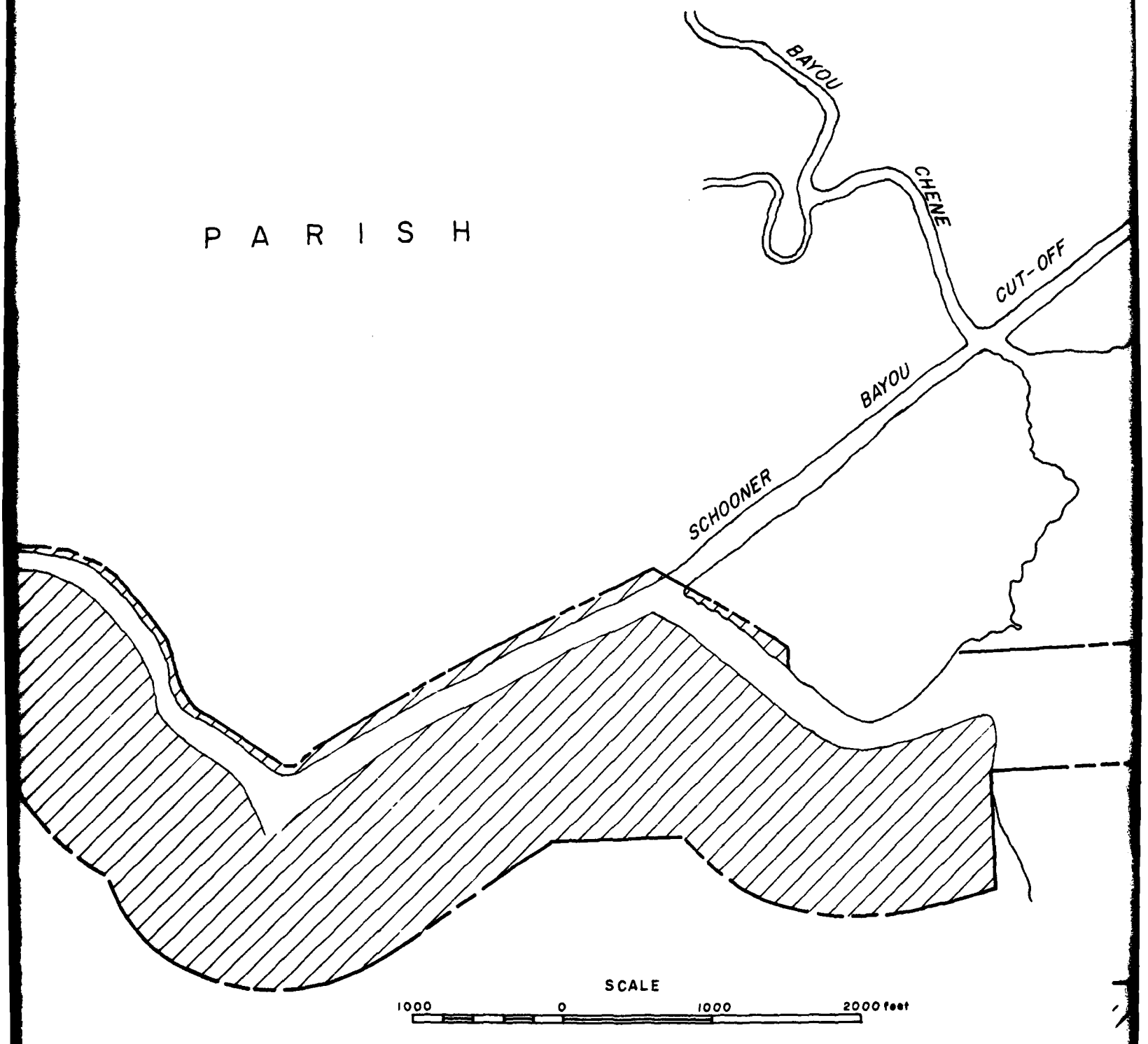
JULY 1978 FILE NO H-2-26978

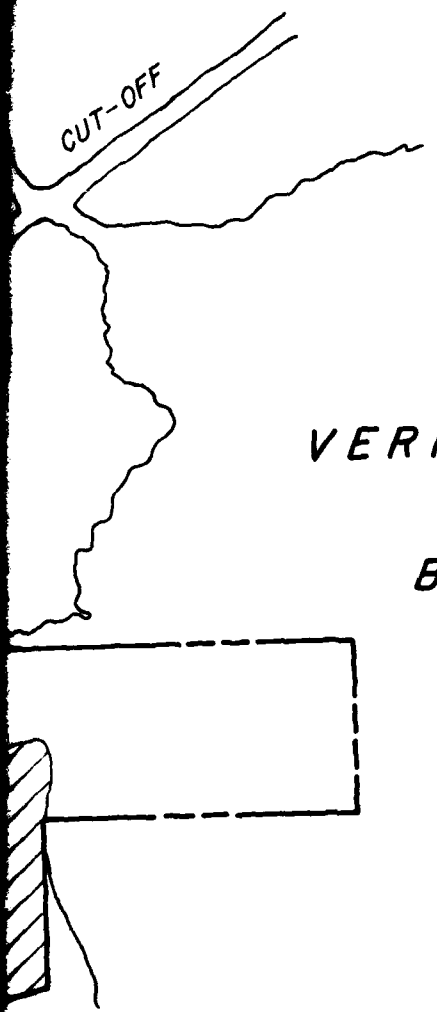
PLATE 12

1 H


MATCH PLATE 12
SCHOONER


N
HOONER
V E R M I L I O N
BAYOU


BAYOU
CHENE
CUT-OFF
PARISH
BAYOU
SCHOONER
SCALE
1000
0
1000
2000 feet



LEGEND

EASEMENT LINE

PREVIOUSLY USED DISPOSAL AREA

ENVIRONMENTAL STATEMENT
OPERATIONS AND MAINTENANCE OF FOUR PROJECTS
IN THE MERMENTAU BASIN, LOUISIANA

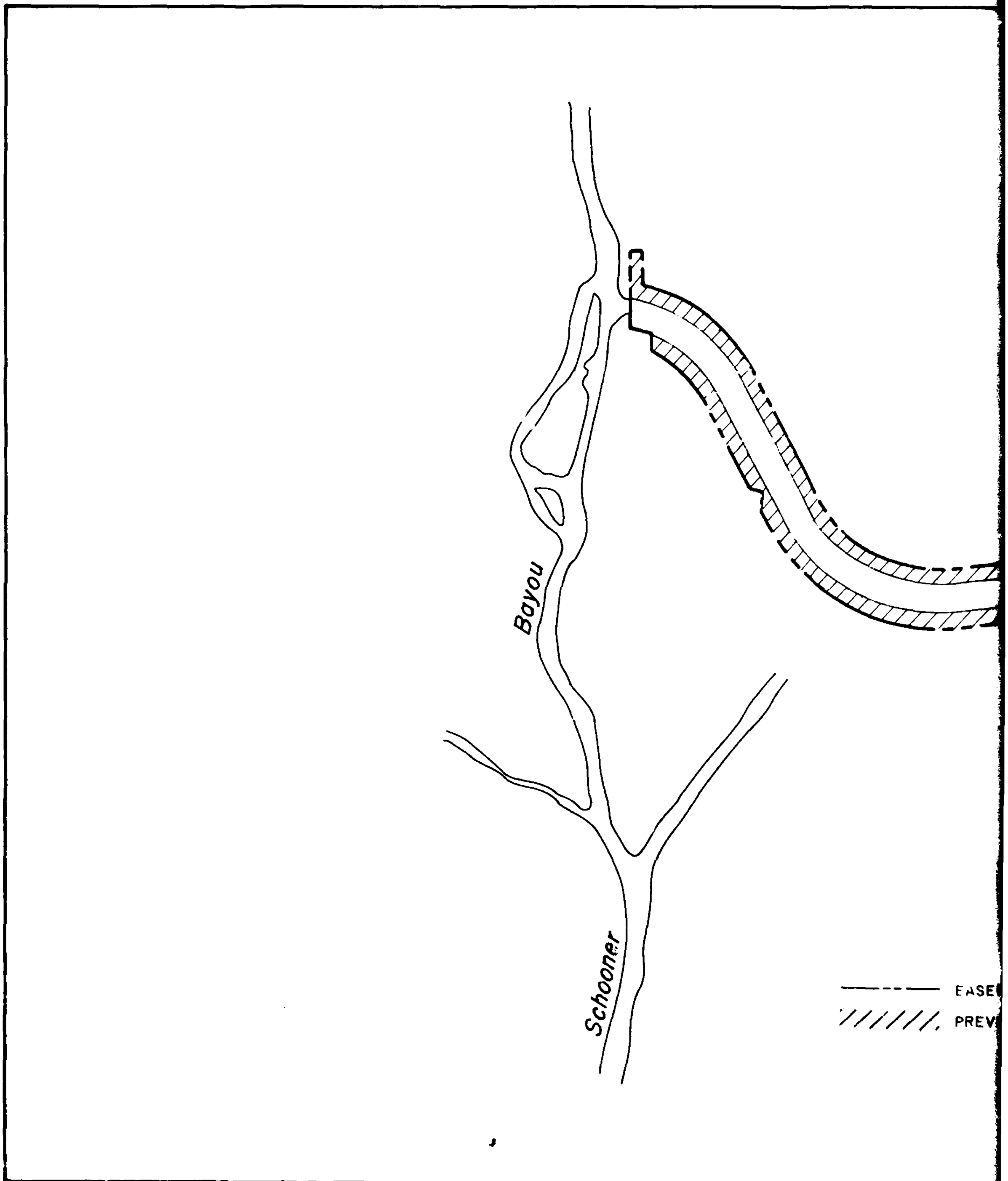
MERMENTAU RIVER, LA. PROJECT
DISPOSAL AREAS

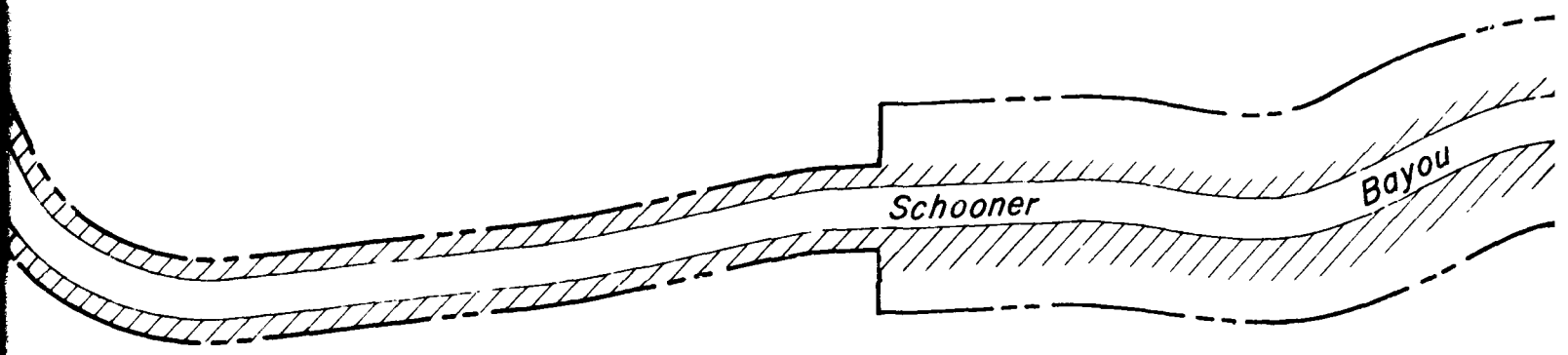
U. S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS

JULY 1978 FILE NO. H-2-26978

PLATE 13

1 H


Bayou
Schooner
EASE
PREV



V E R M I L I O N

LEGEND

——— EASEMENT LINE

////// PREVIOUSLY USED DISPOSAL AREA

NOTE:
354.24 ACRES OF EASEM

1.2

AD-A126 609 COMPOSITE ENVIRONMENTAL STATEMENT FOR OPERATIONS AND MAINTENANCE OF FOUR PROJECTS IN THE MERMENTAU BASIN LOUISIANA(U) ARMY ENGINEER DISTRICT NEW ORLEANS LA 3/3

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5-83
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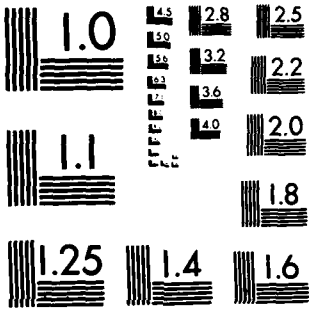
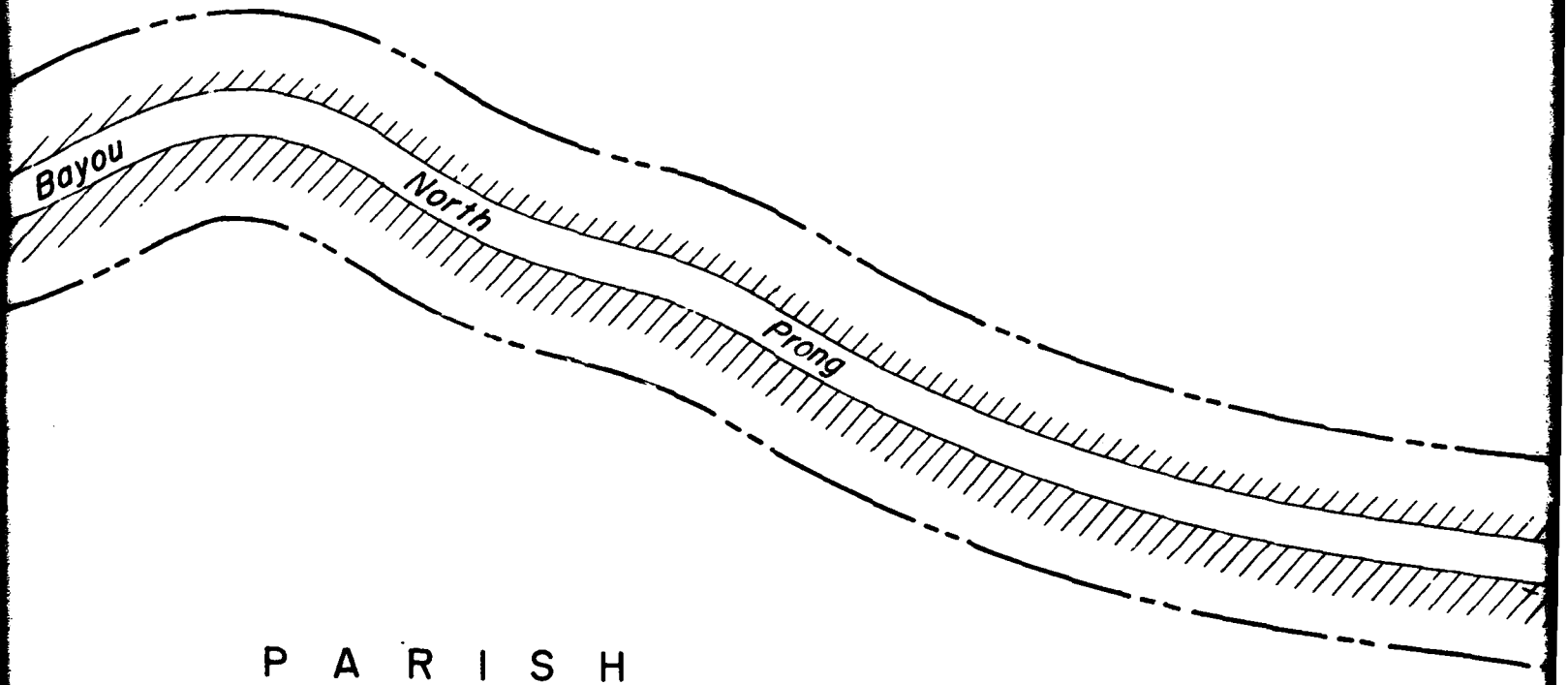


MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A



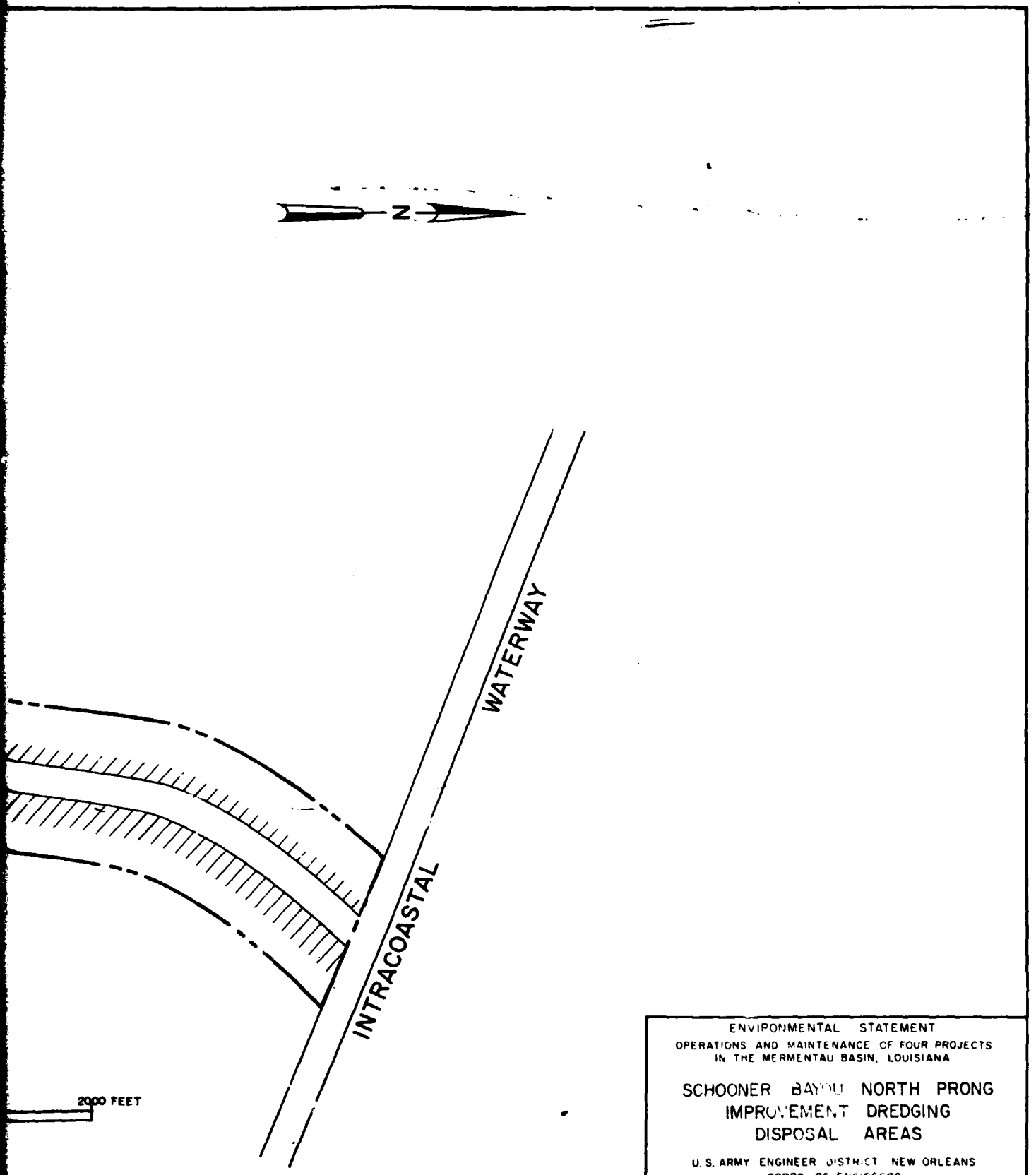
P A R I S H

SCALE

1000 0 1000 200

24 ACRES OF EASEMENT

13



ENVIRONMENTAL STATEMENT
OPERATIONS AND MAINTENANCE OF FOUR PROJECTS
IN THE MERMENTAU BASIN, LOUISIANA

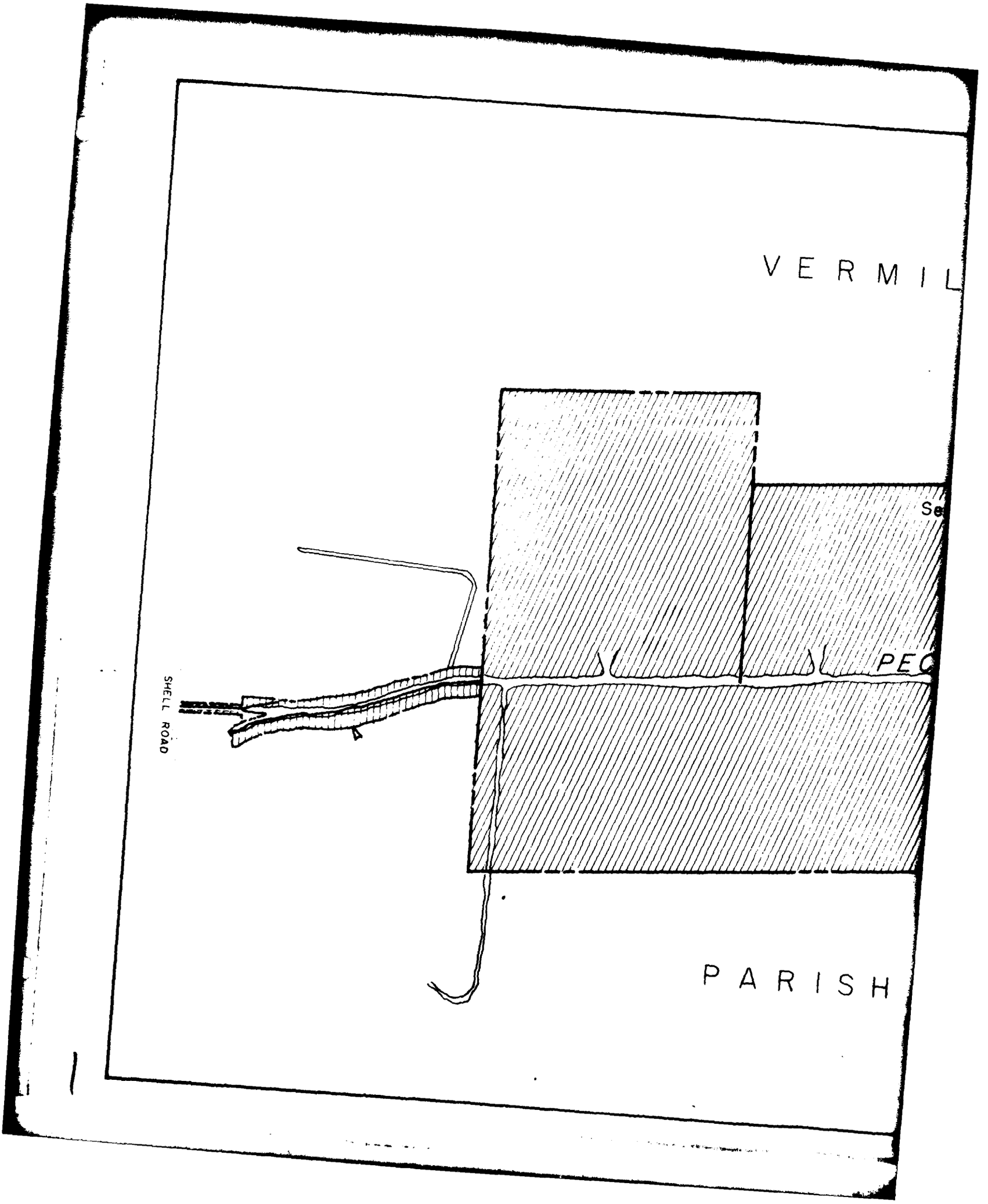
SCHOONER BAYOU NORTH PRONG
IMPROVEMENT DREDGING
DISPOSAL AREAS

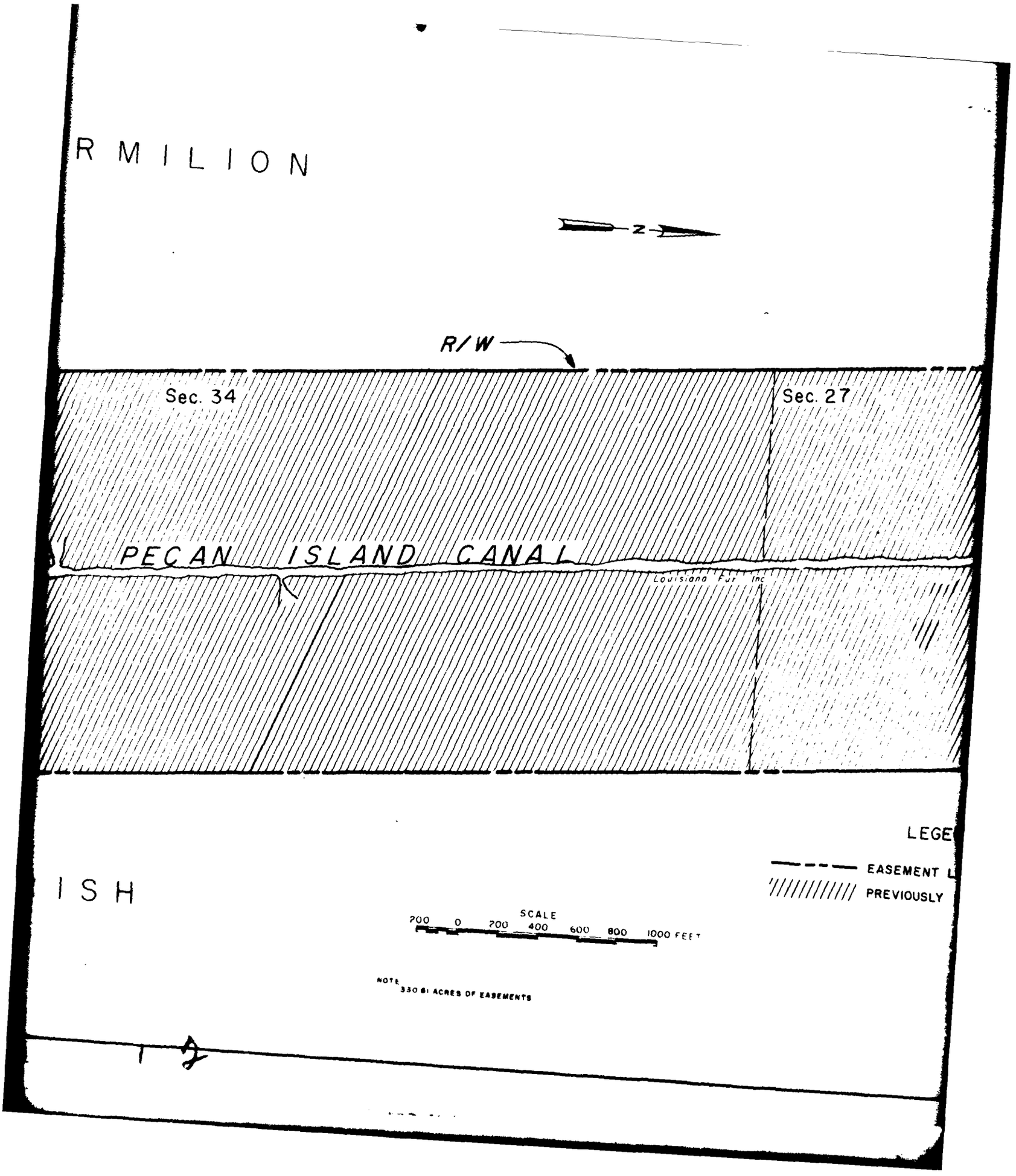
U. S. ARMY ENGINEER DISTRICT NEW ORLEANS
CORPS OF ENGINEERS

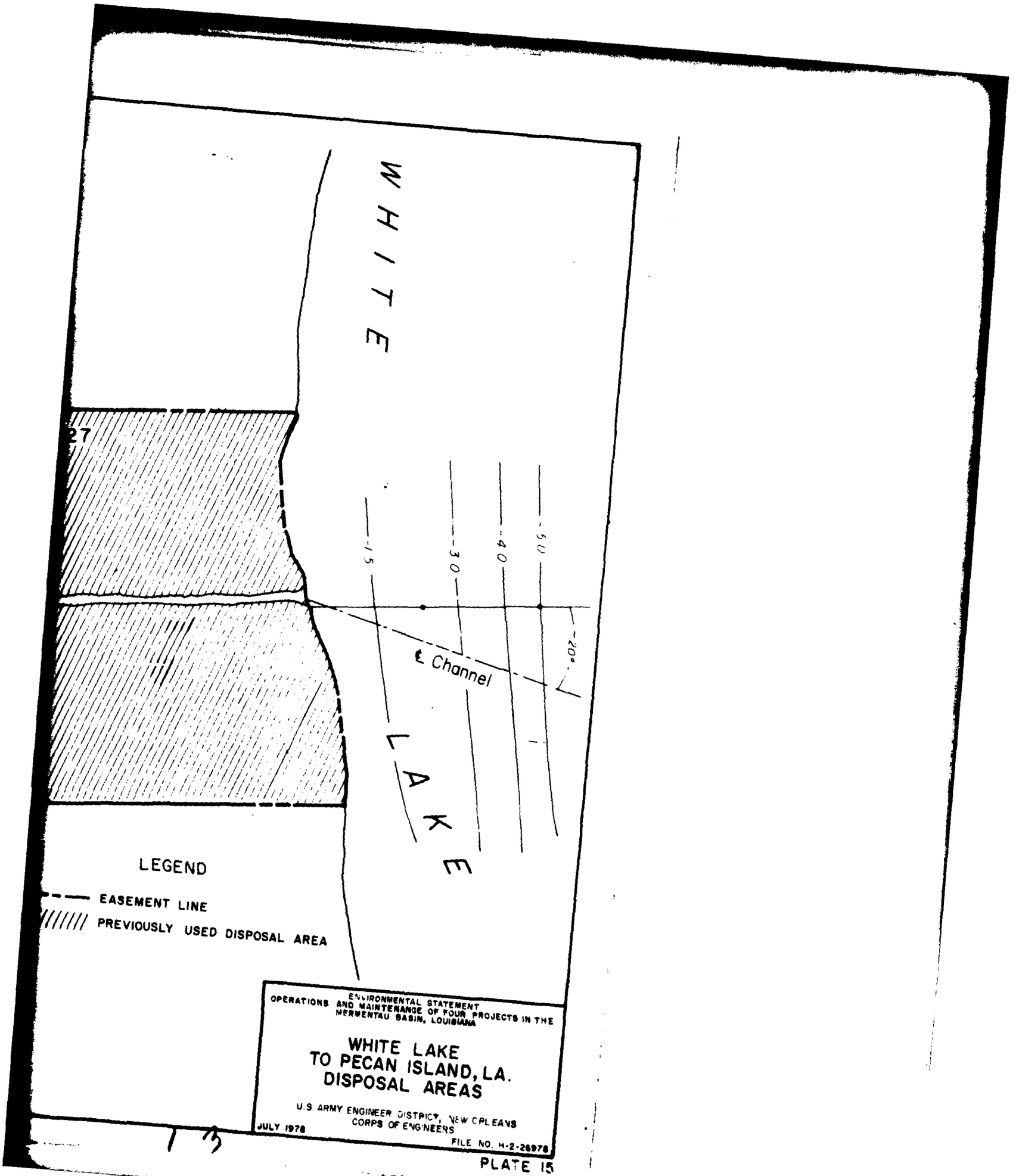
JULY 1978 FILE NO H-2-26978

PLATE 14

14


VERMIL
Se
PEC
SHELL ROAD
PARISH


R M I L I O N
R/W
Sec. 34
Sec. 27
PECAN ISLAND CANAL
Louisiana Fur Inc
LEGE
EASEMENT L
PREVIOUSLY
I S H
SCALE
200 0 200 400 600 800 1000 FEET
NOTE
330 81 ACRES OF EASEMENTS


WHITE
LAKE
-15
-30
-40
-50
-20
℄ Channel
LEGEND
EASEMENT LINE
PREVIOUSLY USED DISPOSAL AREA
ENVIRONMENTAL STATEMENT
OPERATIONS AND MAINTENANCE OF FOUR PROJECTS IN THE MERMENTAU BASIN, LOUISIANA
WHITE LAKE
TO PECAN ISLAND, LA.
DISPOSAL AREAS
U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
JULY 1978
FILE NO. H-2-26978
PLATE 15

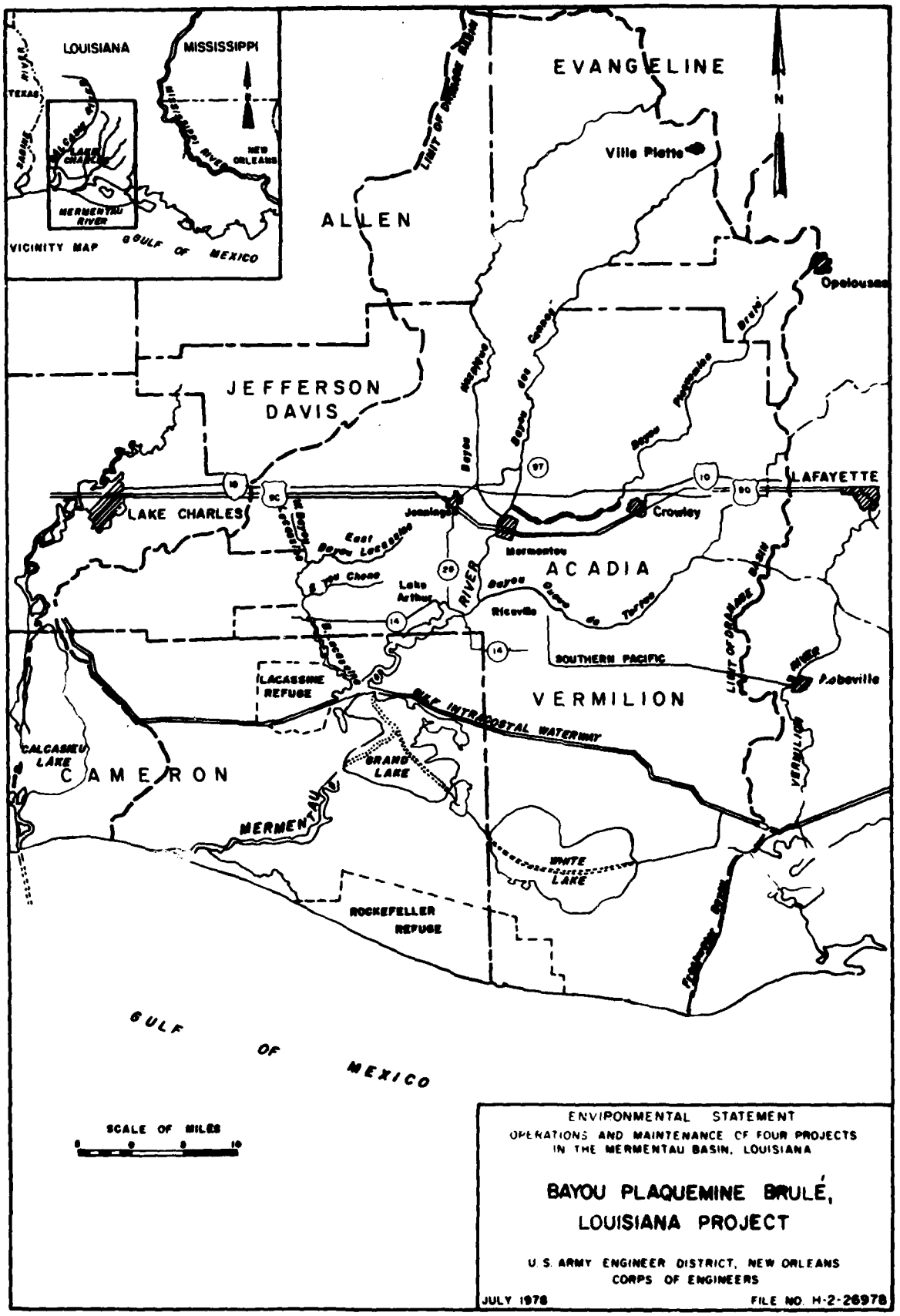
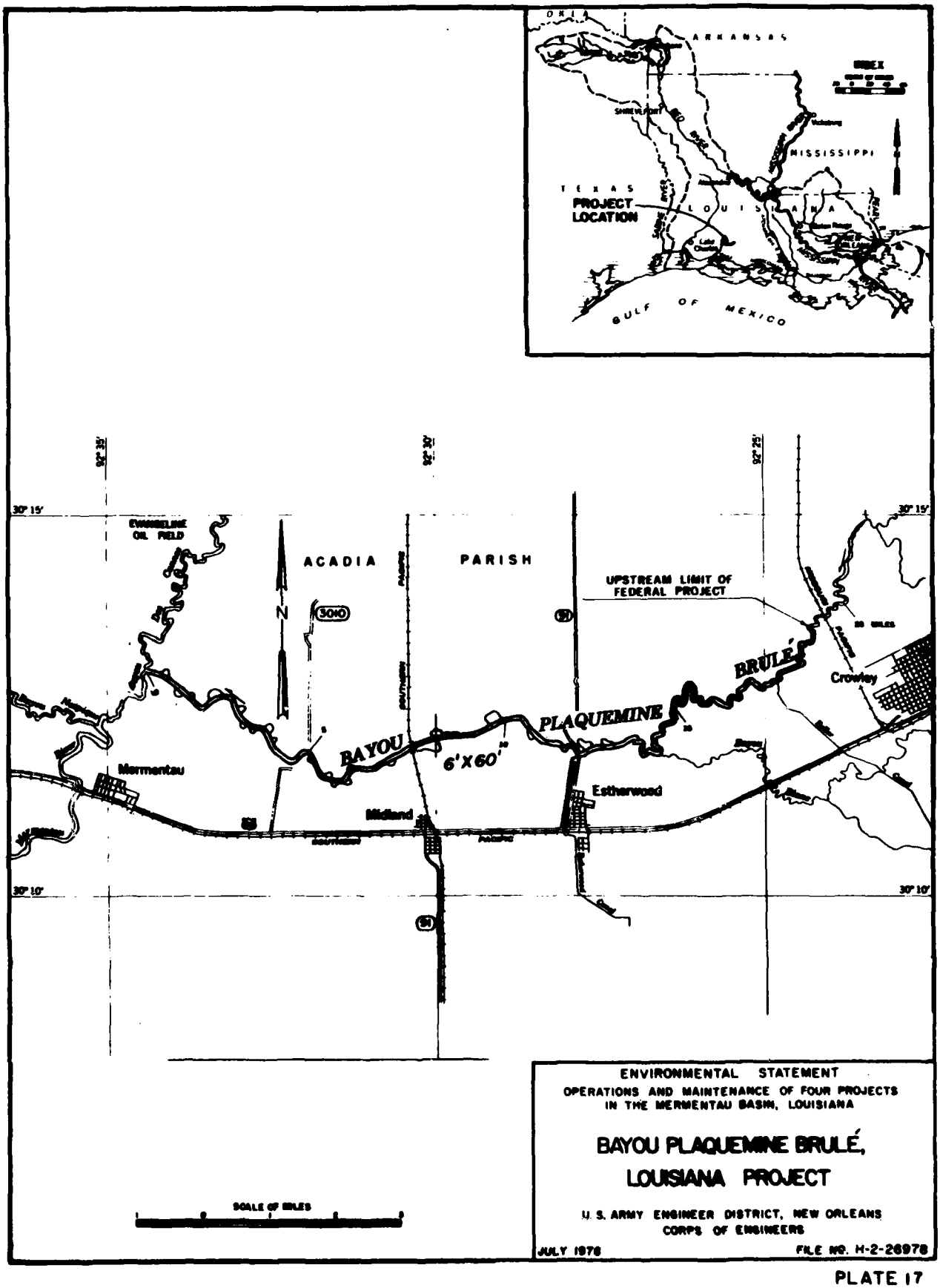

LOUISIANA
MISSISSIPPI
TEXAS
SABINE RIVER
CALCASIEU RIVER
LAKE CHARLES
MERMENTAU RIVER
MISSISSIPPI RIVER
NEW ORLEANS
VICINITY MAP
GULF OF MEXICO
LIMIT OF DRAINAGE BASIN
EVANGELINE
Ville Platte
ALLEN
Opelousas
JEFFERSON DAVIS
Bayou Nezpique
Bayou des Cannes
Bayou Plaquemine Brule
Bayou Queue de Tortue
LAFAYETTE
LAKE CHARLES
Jennings
Crowley
East Bayou Lacassine
Mermentau
ACADIA
Lake Arthur
Bayou Queue de Tortue
Ricoville
SOUTHERN PACIFIC
LACASSINE REFUGE
GIWW INTRACOASTAL WATERWAY
VERMILION
Abbeville
CALCASIEU LAKE
CAMERON
GRAND LAKE
MERMENTAU
WHITE LAKE
ROCKEFELLER REFUGE
GULF OF MEXICO
SCALE OF MILES
0 5 10
ENVIRONMENTAL STATEMENT
OPERATIONS AND MAINTENANCE OF FOUR PROJECTS IN THE MERMENTAU BASIN, LOUISIANA
BAYOU PLAQUEMINE BRULÉ, LOUISIANA PROJECT
U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
JULY 1978
FILE NO. H-2-26978

PLATE 16



ENVIRONMENTAL STATEMENT

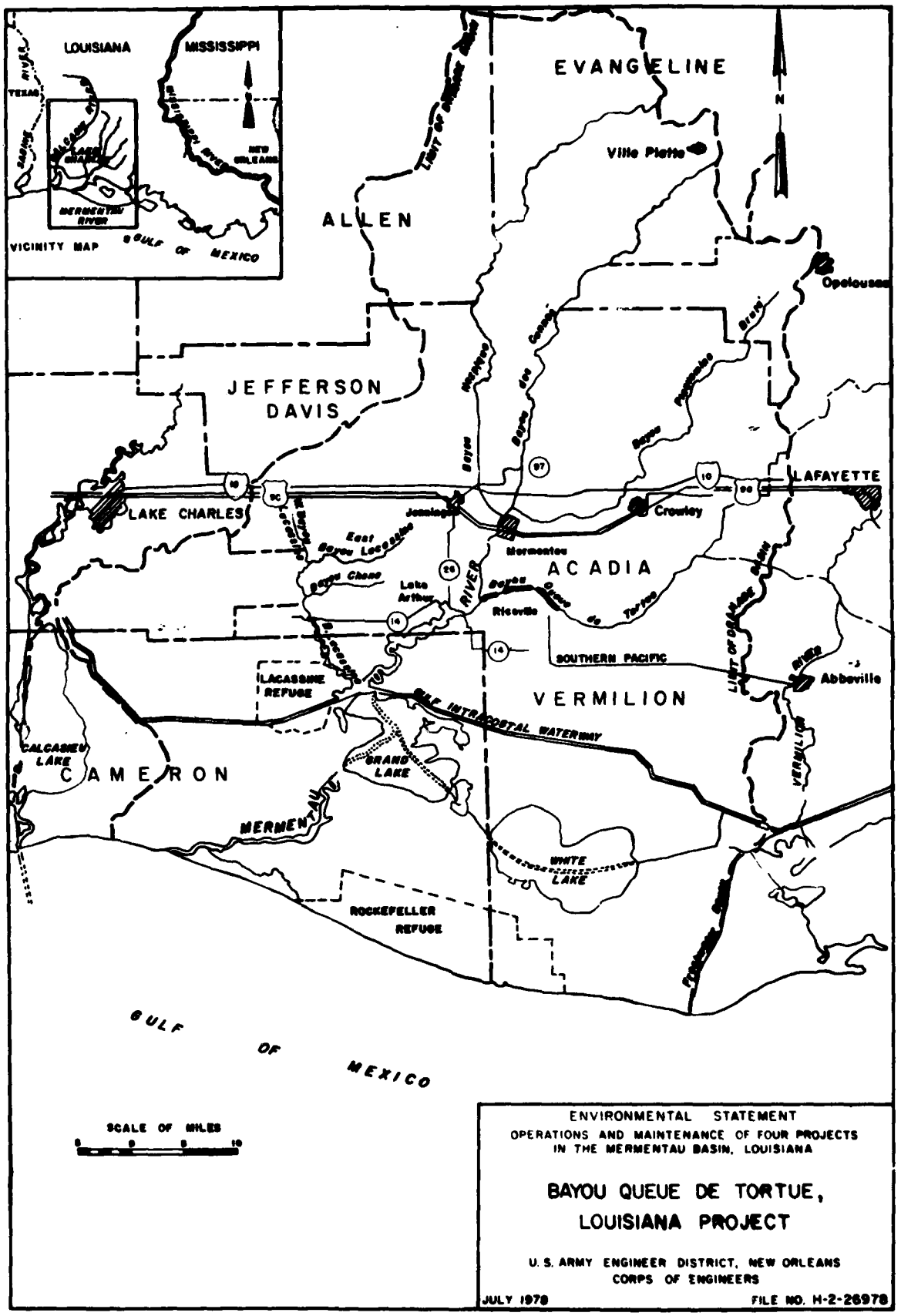
OPERATIONS AND MAINTENANCE OF FOUR PROJECTS IN THE MERMENTAU BASIN, LOUISIANA

BAYOU PLAQUEMINE BRULÉ, LOUISIANA PROJECT

U. S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS

JULY 1978 FILE NO. H-2-26978

PLATE 17



ENVIRONMENTAL STATEMENT

OPERATIONS AND MAINTENANCE OF FOUR PROJECTS IN THE MERMENTAU BASIN, LOUISIANA

BAYOU QUEUE DE TORTUE, LOUISIANA PROJECT

U. S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS

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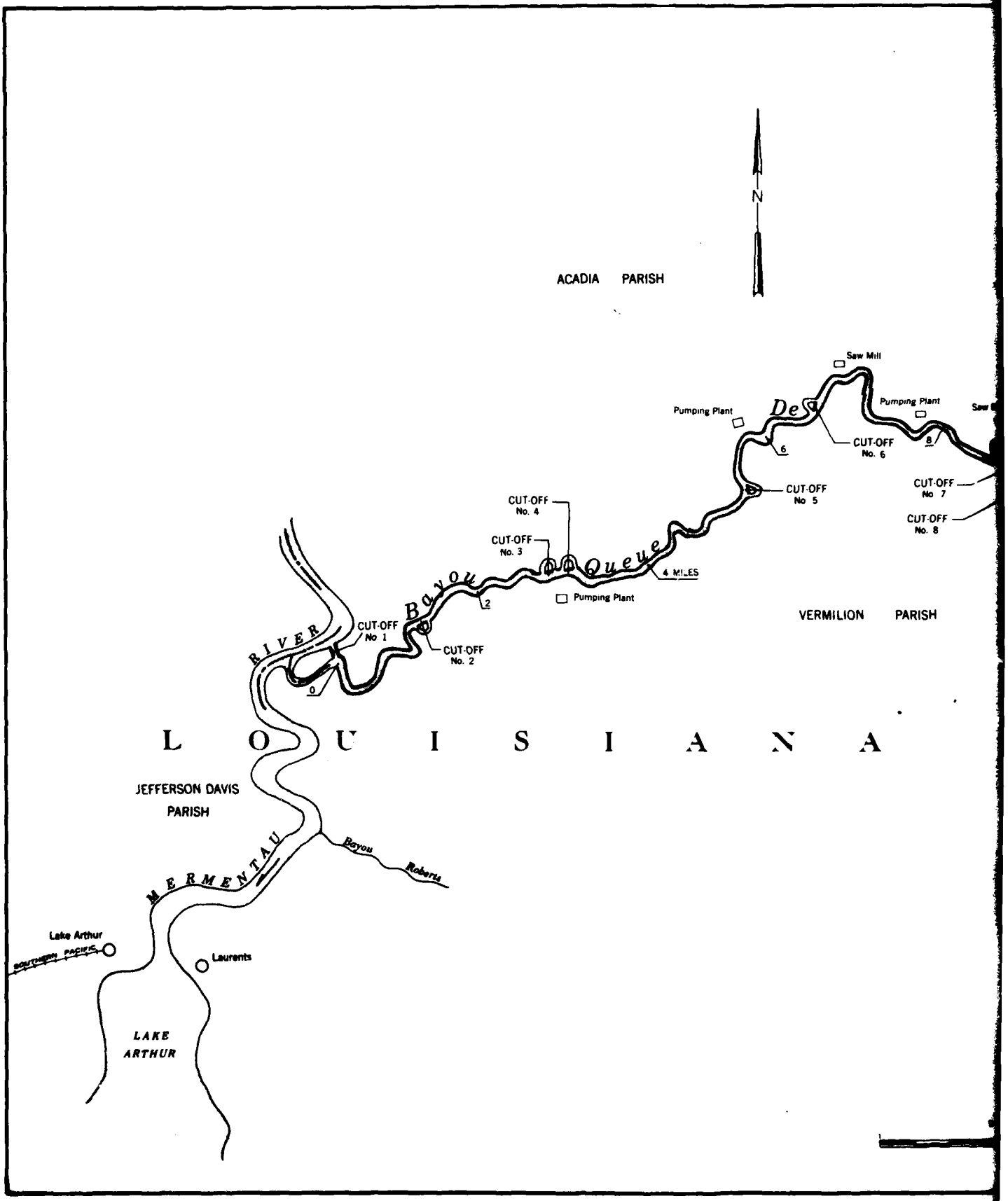
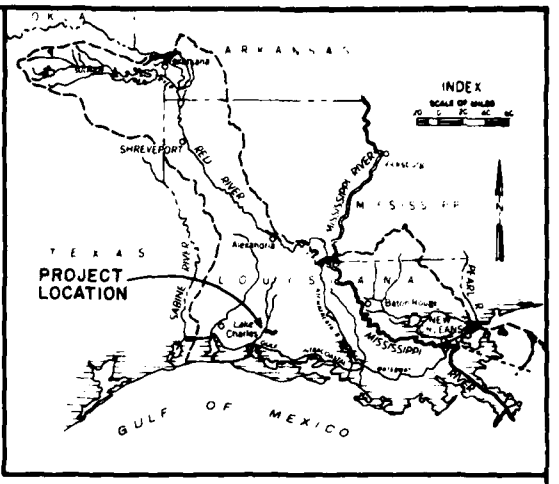
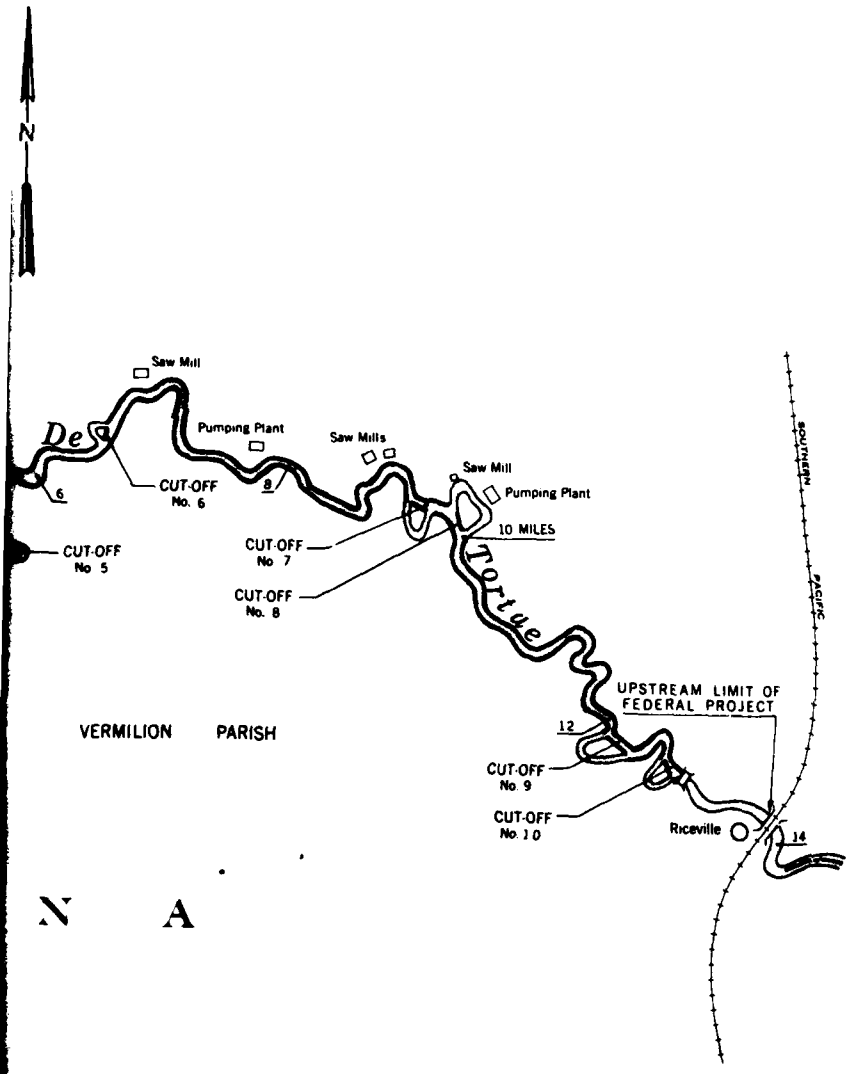
PLATE 18


N
ACADIA PARISH
Saw Mill
Pumping Plant
Pumping Plant
De
CUT-OFF No. 6
CUT-OFF No 7
CUT-OFF No. 8
CUT-OFF No 5
CUT-OFF No. 4
CUT-OFF No. 3
Queue
4 MILES
Pumping Plant
VERMILION PARISH
Bayou
RIVER
CUT-OFF No 1
CUT-OFF No. 2
LOUISIANA
JEFFERSON DAVIS PARISH
MERMENTAU
Bayou Roberts
Lake Arthur
SOUTHERN PACIFIC
Laurents
LAKE ARTHUR





SCALE OF MILES

ENVIRONMENTAL STATEMENT
OPERATIONS AND MAINTENANCE OF FOUR PROJECTS
IN THE MERMENTAU BASIN, LOUISIANA

BAYOU QUEUE DE TORTUE, LOUISIANA PROJECT

U. S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS

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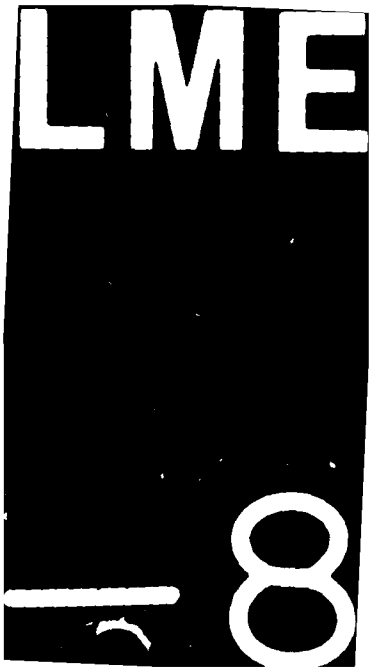
PLATE 19

12


LME
8